

## 1) THE DISEASE AND ITS EPIDEMIOLOGY

### A. Etiologic Agent

Botulism is caused by exposure to a neurotoxin produced by *Clostridium botulinum*. *C. botulinum* is an anaerobic, spore-forming bacterium. The toxin is produced as the bacteria are multiplying, and the bacteria multiply under anaerobic (no oxygen) conditions and low acid (generally pH<4). There are seven types of botulinum toxin (A-G), but types A, B, and E primarily cause human botulism.

*C. botulinum* toxin is considered a potential bioterrorist agent. If acquired and properly disseminated, botulinum toxin could cause a serious public health challenge in terms of casualties and controlling the spread of disease.

### B. Description of Illness

- **General facts:** *C. botulinum* toxin is one of the most potent and lethal substances known. In humans, botulism manifests itself in one of three clinical forms: foodborne botulism, infant, or wound botulism. The site of toxin production is different for each of the forms, but they all share the flaccid paralysis that results from exposure to botulinum toxin.

**Foodborne botulism** is a severe poisoning caused by the ingestion of pre-formed *C. botulinum* toxin.

**Infant (intestinal) botulism** occurs when *C. botulinum* spores are ingested, and the toxin is formed in the intestines in the absence of mature gastrointestinal flora. The disease is usually confined exclusively to infants less than one year of age.

**Wound botulism** occurs when *C. botulinum* multiplies in the wound and produces the toxin, which is then absorbed into the bloodstream.

- **Occurrence:** Botulism occurs worldwide, as sporadic cases and as family and general outbreaks. In the United States, since 1973 a median of 24 cases of foodborne botulism, 3 cases of wound botulism, and 71 cases of infant botulism have been reported annually to the Centers for Disease Control and Prevention. Recently, use of black tar heroin by chronic drug users has led to a dramatic increase in the number of cases of wound botulism since 1994.
- **Incubation period:** The incubation period is variable, but neurological symptoms of foodborne botulism usually appear within 12-36 hours (range: 6 hours to 8 days) after eating contaminated food. The median incubation period for wound botulism is generally longer than for foodborne botulism, with a median of 7 days and a range of 4 to 14 days. In general, the shorter the incubation period the more severe the disease. The incubation period for infant botulism is unknown since it is usually not known when the spores are ingested.

- **Common symptoms:**

**Foodborne botulism** is dominated by neurologic signs and symptoms, including blurred or double vision, dysphasia, dry mouth and peripheral muscle weakness. Symmetric descending flaccid paralysis is classic for botulism, beginning with the cranial nerves. Paralysis then affects the upper extremities, the respiratory muscles, and finally the lower extremities. The clinical symptoms are similar no matter which toxin is responsible for the illness, but type A has been associated with a higher case-fatality rate than B or E. In general, the case-fatality rate for foodborne botulism is 5-10%. Recovery may take months.

**Wound botulism** usually presents with the same clinical picture as foodborne botulism.

**Infant botulism** has a distinctly different clinical presentation than wound and foodborne botulism. The earliest clinical sign in infant botulism is constipation, which is followed by poor feeding, decreased sucking, lethargy, listlessness, difficulty swallowing, a weak cry, and lack of muscle tone giving rise to the term “floppy baby syndrome.” In some cases, respiratory insufficiency and respiratory arrest may occur. Infant botulism presents with a wide range of severity, from mild illness to sudden death.

- **Treatment:** Botulism can be treated with an antitoxin which blocks the action of toxin circulating in the blood. Immune globulin for infants is available from the California Department of Public Health (BabyBIG®), and antitoxin for older children and adults is available through CDC. Patients usually require ventilator support, which is commonly needed for 2 to 8 weeks. For wound botulism, in addition to antitoxin, the wound should be debrided and/or drainage established, with appropriate antibiotics (e.g., penicillin). For infant botulism, meticulous supportive care is essential.

### C. Reservoirs

*C. botulinum* spores are ubiquitous in soils worldwide. The spores can survive indefinitely in soil under almost any environmental condition. Spores are also found in marine sediment.

### D. Modes of Transmission

**Foodborne botulism** is acquired by ingesting pre-formed toxin. This usually occurs as a result of ingesting food that has been inadequately processed and then inadequately prepared before being eaten. The most frequent source is home-canned foods, but outbreaks have also been attributed to baked potatoes in foil, minced garlic in oil and sautéed onions held under a layer of butter. The toxin is destroyed by boiling.

**Wound botulism** occurs when wounds are contaminated with dirt or gravel containing botulism spores. Wound botulism has also been reported among drug abusers.

**Infant botulism**, which is the most common form of botulism in the United States, occurs as a result of ingestion of the spore form of the bacteria, which then goes on to germinate and produce toxin in the intestines. This can happen through ingestion of food, soil, or dust contaminated with botulism spores. Honey often contains *C. botulinum* spores. Some cases of infant botulism have occurred in children living in areas of construction and earth disruption.

**E. Period of Communicability**

Despite excretion of *C. botulinum* toxin and organism at high levels (about  $10^6$  organisms/gram) in the feces of intestinal botulism patients weeks to months after onset of illness, no instance of person-to-person spread has ever been documented for botulism. Foodborne botulism patients typically excrete the toxin for shorter periods.

## 2) ACTIONS REQUIRED AND CONTROL MEASURES

### A. Reporting Requirements

Botulism is physician reportable by telephone immediately on the day of recognition or strong suspicion to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). A mailed report is also required within 12 hours. The director of any clinical laboratory must also report laboratory evidence of botulism to both the DPH and the LHD. See current lists of physician Reportable Diseases (Attachment A) and Laboratory Reportable Significant Findings (Attachment C).

### B. Case Definition

#### Foodborne botulism:

- **Probable Case:** a clinically compatible case with an epidemiologic link (e.g., ingestion of a home-canned food within the previous 48 hours).
- **Confirmed Case:** a clinically compatible case that is laboratory confirmed by isolation of *C. botulinum* from stool or detection of botulinum toxin in serum, stool, or patient's food or that occurs among persons who ate the same food as persons who have laboratory-confirmed botulism.

#### Infant botulism:

- **Confirmed Case:** a clinically compatible case in a child aged less than 1 year that is laboratory confirmed by detection of botulism toxin in stool or serum or *C. botulinum* has been isolated from stool.

#### Wound botulism:

- **Confirmed Case:** a clinically compatible case that is laboratory confirmed by detection of botulism toxin in serum or isolation of *C. botulinum* from a wound, in a patient who has no suspected exposure to contaminated food and who has a history of a fresh, contaminated wound during the 2 weeks before onset of symptoms, or a history of injection drug use within the 2 weeks before onset of symptoms.

### C. Case Investigation

- **DPH Responsibility:** Activities include ensuring that appropriate diagnostic evaluation is done, interviewing suspect cases for possible exposures, and coordinating shipment of antitoxins from CDC.
- **LHD Responsibility:** Provide information and educational materials describing the nature of the disease and preventive measures.

### D. Control Measures

If a bioterrorist event is suspected, the DPH and other response authorities will work closely with local health departments on how to proceed.

## Fact Sheet

### What is botulism?

Botulism is a serious illness caused by a nerve toxin made by the bacterium, *Clostridium botulinum*. A toxin is a poison that is released by some bacteria and viruses. There are three types of botulism: foodborne, wound, and infant.

### Where are *Clostridium botulinum* bacteria found?

These bacteria are commonly found in the soil and grow best in low oxygen conditions.

### How do these bacteria spread?

Foodborne botulism occurs when person eats preformed toxin present in contaminated food. It often involves improperly processed home canned foods. Infant botulism occurs when children eat spores that grow and produce bacteria. These bacteria then reproduce in the gut and release toxin. Infant botulism has been associated with eating honey that contains the bacterial spores. Light and dark corn syrups have also been reported to contain the spores, although cases of infant botulism have not been linked to corn syrup. Wound botulism, a rare disease, occurs when spores get into an open wound and reproduce in an anaerobic (no oxygen) environment.

### Who gets botulism?

Anyone can get foodborne or wound botulism. Infant botulism occurs among children less than 1 year of age.

### What are the symptoms of botulism?

Foodborne and wound botulism produce symptoms that affect the nervous system. Symptoms include blurred or double vision, dry mouth, and muscle paralysis that may affect breathing. About 15% of persons with foodborne botulism die. Infant botulism has a wide range of symptoms including constipation, loss of appetite, weakness, an altered cry, and a striking loss of head control. About 2% of the cases of infant botulism die.

### How soon do symptoms appear?

Symptoms of foodborne botulism usually appear 12 to 36 hours after eating the food that contains the toxin. However, it is possible for symptoms to take several days to develop. The incubation period for infant botulism is unknown since the exact time of ingestion often cannot be determined. Symptoms of wound botulism may take up to 2 weeks to appear.

### How long can an infected person carry *Clostridium botulinum*?

*C. botulinum* toxin and organism may be shed at high levels in the feces of infants with botulism weeks to months after onset of illness. However no instance of secondary person-to-person transmission has been documented. Foodborne botulism patients typically excrete the toxin for shorter periods.

### Should an infected person be excluded from school or work?

No instance of person-to-person spread has ever been documented for botulism; most infected people may return to school or work when they have recovered from their illness.

**What is the treatment for botulism?**

The symptoms of botulism make hospitalization necessary. If diagnosed early, botulism can be treated with an antitoxin, which blocks the action of the toxin circulating in the blood. This can prevent patients from worsening, but recovery still takes many weeks. If left untreated, a patient may need to be on a breathing machine (ventilator) for weeks and would require intensive medical and nursing care. Infant botulism is treated with immune globulin (BabyBIG®, Botulism Immune Globulin Intravenous (Human) (BIG-IV)), which is similar to the antitoxin. Most cases of botulism recover with appropriate medical care.

**How can botulism be prevented?**

Honey and corn syrup should not be fed to infants less than 1 year old. All canned and preserved foods should be properly processed and prepared. Bulging containers should not be opened, and commercial cans with bulging lids should be returned unopened to the place of purchase. Goods with off-odors should not be eaten or even tasted. Home canned vegetables should be boiled, with stirring, for at least 3 minutes before eating.

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## 1) THE DISEASE AND ITS EPIDEMIOLOGY

### A. Etiologic Agent

*Campylobacter jejuni* (*C. jejuni*) is the usual cause of campylobacteriosis; *C. coli*, *C. laridis*, and *C. fetus* ssp. *fetus* are less common causes of campylobacteriosis in humans.

### B. Description of Illness

- **General facts:** *Campylobacter* is one of the most common bacterial causes of diarrheal illness in the United States. Infection occurs more frequently in summer months and is particularly likely to infect children less than 5 years old (especially infants) and young adults. It is also an important cause of traveler's diarrhea.
- **Occurrence:** It is estimated that 1.3 million persons are affected annually in the United States with most cases occurring as isolated, sporadic events, not as part of recognized outbreaks.
- **Incubation period:** Usually about 2 - 5 days after exposure (range 1 - 10 days).
- **Common symptoms:** Diarrhea (sometimes bloody), abdominal pain, malaise, fever, nausea, and sometimes vomiting may occur. Infection can cause a spectrum of disease ranging from mild, uncomplicated gastroenteritis to fulminant disease similar to acute appendicitis.
- **Treatment:** None generally indicated except rehydration and electrolyte replacement.

### C. Reservoirs

*Campylobacter* bacteria are endemic in animals, most notably poultry and cattle. A very large percentage of raw poultry is contaminated with *C. jejuni*. Domestic animals (puppies, kittens, other pets), livestock (sheep, pigs), rodents, and birds may also be sources of human infection.

### D. Modes of Transmission

The most common mode of transmission is ingestion of contaminated food or water. This includes raw and undercooked poultry or pork, raw milk and raw milk products, and inadequately treated water. Other foods may be cross-contaminated from poultry, especially through the use of common cutting boards. Common source outbreaks associated with undercooked chicken, unpasteurized milk, and non-chlorinated water have occurred. In addition, animal-to-person transmission can occur through contact with infected pets (e.g., puppies with diarrhea) and farm animals. Person-to-person spread occurs occasionally, particularly from very young children.

### E. Period of Communicability

The disease is communicable for as long as the infected person excretes *Campylobacter* bacteria in their stool. This can occur for several days to several weeks after symptom onset.

## 2) ACTIONS REQUIRED AND CONTROL MEASURES

### A. Reporting Requirements

Campylobacteriosis is physician reportable by mail within 12 hours of recognition or strong suspicion to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). The director of any clinical laboratory must also report laboratory evidence of campylobacteriosis to both the DPH and the LHD. See current lists of physician Reportable Diseases (Attachment A) and Laboratory Reportable Significant Findings (Attachment C).

### B. Case Definition

- **Confirmed Case:** Isolation of *Campylobacter* from any clinical specimen.

### C. Case Investigation

- **DPH Responsibility:** DPH is available to the LHD for assistance, consultation, and guidance and to ensure that appropriate investigative and control actions are being taken.
- **LHD Responsibility:** Using the “General Enteric Diseases Interview Form” (Attachment F), interview case and identify individuals in high-risk occupations or settings (see below). Completed GEDIF forms should be entered directly into Maven or faxed to the DPH at 860-509-7910.

Provide information and educational materials describing the nature of the disease and preventive measures. The importance of frequent and thorough hand washing should be stressed for all cases and contacts. Encourage a physician visit if symptoms persist.

### D. Control Measures for Individuals in High-Risk Occupations or Settings

- **Food Handler:** Individuals with laboratory-confirmed infection should be excluded from direct food handling until they are asymptomatic. Exclusion of asymptomatic individuals is indicated only for those with questionable hygienic habits. Proper hand washing should be stressed.
- **Health Care Worker with Direct Patient Contact:** Individuals with laboratory-confirmed infection should be excluded from direct care of patients until they are asymptomatic. Exclusion of asymptomatic individuals is indicated only for those with questionable hygienic habits. Proper hand washing should be stressed.
- **Day Care Setting:** Symptomatic children should be excluded from day care. Improved sanitation and personal hygiene should be emphasized in day care settings. Proper hand washing by staff and children should be stressed, especially after using the toilet and/or handling soiled diapers, and prior to preparing or eating food.

- **Household Contacts:** Household contacts with diarrhea should be excluded from food handling and the care of children and/or patients until they are asymptomatic. Proper hand washing should be stressed.

## Fact Sheet

### What is campylobacteriosis?

Campylobacteriosis is an illness that is caused by the bacterium, *Campylobacter*. This bacterium affects the intestinal tract and rarely, the bloodstream. It is a common cause of diarrhea in the United States. Most cases are seen in the summer months and can occur as single cases or outbreaks.

### Where are *Campylobacter* bacteria found?

Poultry, cattle, pigs, and sheep may carry these bacteria in their intestines. Most raw poultry meat is contaminated with *Campylobacter*. Puppies, kittens and other pets may also be sources of human infection.

### How do these bacteria spread?

*Campylobacter* bacteria are generally spread by eating contaminated food, including unpasteurized milk and untreated water, or by direct contact with fecal material from infected animals. Person-to-person spread occurs occasionally, particularly from very young children.

### Who gets campylobacteriosis?

Anyone can get campylobacteriosis.

### What are the symptoms of campylobacteriosis?

Campylobacteriosis may cause mild or severe diarrhea, abdominal pain, fever, nausea, and vomiting. Traces of blood or mucus may be found in the liquid stool.

### How soon do symptoms appear?

The symptoms generally appear 2 to 5 days after the exposure (range 1 – 10 days).

### How long can an infected person carry *Campylobacter*?

Generally, infected people will pass the bacteria in their stool for a few days to a week or more.

### Should an infected person be excluded from school or work?

Since the organism is passed in the stool, people with active diarrhea who are unable to control their bowel habits (infants, young children, adults with poor bowel control/hygiene) should be excluded from school or work. Most infected people may return to school or work when diarrhea has ended.

### What is the treatment for campylobacteriosis?

Most people infected with *Campylobacter* will recover on their own. Serious cases may require fluids to prevent dehydration. Antibiotics are occasionally used to treat severe cases or to shorten the carrier phase, which may be important for food handlers, children in daycare, and health care workers. Since relapses occasionally occur, some physicians might treat mild cases with antibiotics to prevent a recurrence of symptoms.

**How can campylobacteriosis be prevented?**

Always treat raw poultry, beef, and pork as if they are contaminated and handle accordingly.

- Wrap fresh meat in plastic bags at the market to prevent blood from dripping on other foods.
- Refrigerate foods promptly; minimize holding at room temperature.
- Cutting boards, counters, and utensils used for preparation should be washed immediately after use to prevent cross contamination with other foods.
- Avoid eating raw or undercooked meats.
- Make sure the correct internal cooking temperature is reached for each type of meat, particularly when using a microwave.
- Avoid eating raw eggs, uncooked foods with raw egg (e.g., cookie dough), or undercooked foods containing raw eggs.
- Avoid using or drinking raw milk or products made from raw milk.
- Avoid using or drinking untreated water.
- Wash hands carefully before and after food preparation.
- Make sure children, particularly those who handle pets, wash their hands.

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## 1) THE DISEASE AND ITS EPIDEMIOLOGY

### A. Etiologic Agent

Cholera is an acute diarrheal illness caused by enterotoxins produced by *Vibrio cholera* bacteria. Two serogroups, O1 and O139, are responsible for causing extensive epidemics of disease.

### B. Description of Illness

- **General facts:** In the United States, cholera was prevalent in the 1800s but has been virtually eliminated by modern sewage and water treatment systems. Most cases in the United States occur among travelers returning from areas experiencing cholera epidemics.
- **Occurrence:** Pandemic cholera has appeared off and on in most parts of the world since the early 19<sup>th</sup> century. In 1991, an epidemic began in Peru that quickly spread to other countries in South America. In the United States, most cases occur among travelers returning from areas experiencing cholera epidemics. Sporadic cases have also occurred among persons eating inadequately cooked shellfish harvested from coastal waters along the Texas and Louisiana borders.
- **Incubation period:** Ranges from a few hours to 5 days (commonly 2 - 3 days).
- **Common symptoms:** Infection with *V. cholera* usually results in asymptomatic or mild illness involving only diarrhea. However, approximately 1 in 20 people infected will develop more severe illness characterized by profuse watery diarrhea, nausea, and some vomiting early in the illness. Because of rapid loss of body fluids, dehydration and shock can occur in most severe cases. Without rehydration therapy, death can result within hours. The case-fatality rate in severe untreated cases may exceed 50%; with proper treatment, the rate is less than 1%.
- **Treatment:** Oral or parenteral rehydration therapy to correct dehydration and electrolyte abnormalities is the most important modality of therapy and should be initiated as soon as the diagnosis is suspected. Antimicrobial therapy results in prompt eradication of vibrio, decreases the duration of diarrhea, and decreases requirements for fluid replacement. It should be considered for people who are moderately to severely ill.

### C. Reservoirs

Humans are the primary reservoir although environmental reservoirs exist in polluted and non-polluted coastal and estuarine waters of the United States, Ecuador, Guam, Kiribati, Italy, and Portugal.

### D. Modes of Transmission

*V. cholera* is usually transmitted by ingesting food or water contaminated directly or indirectly by feces or vomitus of infected persons (e.g., via sewage). Important vehicles include raw and/or undercooked seafood, beverages made with contaminated water or ice, and fruits/vegetables washed with contaminated water.

**E. Period of Communicability**

Although person-to-person spread has not been demonstrated, cholera is presumably transmitted as long as the stool tests positive, usually a few days after recovery from symptoms. Occasionally a carrier state may persist for several months; very rarely, adult chronic biliary infection results in periodic shedding in stool for years. Antibiotics effective against the bacteria shorten the period of communicability.

## 2) ACTIONS REQUIRED/CONTROL MEASURES

### A. Reporting Requirements

Cholera is physician reportable immediately by telephone to the Connecticut Department of Public Health (DPH) and the local health department (LHD) on the day of recognition or strong suspicion of disease. A mailed report is also required within 12 hours. The director of any clinical laboratory must also report laboratory evidence of cholera to both the DPH and LHD. **Additional requirements:** Isolates of *V. cholera* must be submitted to the DPH State Laboratory for confirmation. See current lists of physician Reportable Diseases (Attachment A) and Laboratory Reportable Significant Findings (Attachment C).

### B. Case Definition

- **Confirmed Case:**
  - Isolation of toxigenic (i.e., cholera toxin-producing) *Vibrio cholerae* 01 or 0139 from stool or vomitus, or
  - Serologic evidence of recent infection.

### C. Case Investigation

- **DPH Responsibility:** DPH will contact the testing laboratory and the patient's physician to confirm the diagnosis of cholera and to make the physician aware that someone from the LHD will contact their patient to obtain additional follow-up information. The DPH will then notify the LHD of the above findings and provide additional recommendations regarding follow-up, if needed.
- **LHD Responsibility:** Complete the "CDC Cholera and Other *Vibrio* Illness Surveillance Report" form (Attachment G). Completed forms should be scanned and uploaded to Maven, or faxed to the DPH at 860-509-7910.

In addition, interview case to identify individuals in high-risk occupations or settings (food handler, health care worker with direct patient contact, day care settings).

Provide information and educational materials describing the nature of the disease and preventive measures. The importance of frequent and thorough hand washing should be stressed for all cases and contacts.

### D. Control Measures

Recommendations on exclusion from high-risk occupations or settings should be made in consultation with DPH.

## Fact Sheet

### What is cholera?

Cholera is an illness caused by a bacterium called *Vibrio cholerae*. This bacterium affects the intestinal tract. Only a few cases are recognized in the United States each year.

### Where are *V. cholerae* bacteria found?

*V. cholerae* can be found in people. The bacterium may also live in the environment in brackish (containing some salt) rivers and coastal waters. Shellfish eaten raw have been a source of cholera.

### How do these bacteria spread?

Cholera bacteria are passed in stool and are spread by consuming contaminated food or water.

### Who gets cholera?

Cholera is a rare disease in the United States. People traveling to foreign countries where outbreaks are occurring and people who consume raw or undercooked seafood from warm coastal waters subject to sewage contamination are at greatest risk.

### What are the symptoms of cholera?

People infected with *V. cholerae* may experience mild to severe watery diarrhea, vomiting, and dehydration. In severe cases, shock and organ failure can occur. Without treatment, death can occur in more than 50% of cases within a few hours.

### How soon do symptoms appear?

The symptoms generally appear 2 – 3 days after exposure (range 6 hours - 5 days).

### How long can an infected person carry cholera?

Usually up to a few days after recovery; however, some people may carry it for several months.

### What is the treatment for cholera?

Since severe diarrhea may cause rapid dehydration, replacement of fluids is critical. Antibiotics, such as tetracycline, are also used to shorten the duration of diarrhea and the shedding of cholera in stool. A vaccine is available and is sometimes recommended for travelers to certain foreign countries where cholera is occurring. However, the vaccine offers only partial protection (50%) for a short duration (2 to 6 months).

**How can cholera be prevented?**

The single most important preventive measure is to avoid consuming foods or water in foreign countries where cholera occurs, unless they are known to be safe or have been properly treated. All travelers to areas where cholera has occurred should observe the following recommendations:

- Drink only water that you have boiled or treated with chlorine or iodine. Other safe beverages include tea and coffee made with boiled water and carbonated, bottled beverages with no ice.
  - Eat only foods that have been thoroughly cooked and are still hot, or fruit that you have peeled yourself.
  - Avoid undercooked or raw fish or shellfish, including ceviche (a cold dish made with raw fish).
  - Make sure all vegetables are cooked; avoid salads.
  - Avoid foods and beverages from street vendors.
  - Do not bring perishable seafood back to the United States.
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### A. Etiologic Agent

*Cryptosporidium parvum* is the species associated with human infection. It was recognized as a cause of human illness in 1976. The parasite can be transmitted in the form of oocysts, which are hardy and can survive in the environment for weeks or months. They are resistant to chemical disinfectants used to purify drinking water.

### B. Description of Illness

- **General facts:** Cryptosporidiosis occurs worldwide and affects both humans and animals. It is among the most common cause of persistent diarrhea in patients with AIDS in the United States.
- **Occurrence:** In developed areas such as the United States and Europe, infection has been found in less than 1% - 4.5% of individuals surveyed by stool examination. People who are most likely to become infected with *Cryptosporidium* include the following: children who attend day care centers; child care workers; parents of infected children; international travelers; hikers and campers who drink unfiltered, untreated water; swimmers who swallow water while swimming in swimming pools, lakes, rivers, ponds, and streams; and people who drink from shallow, unprotected wells.
- **Incubation period:** 2 – 10 days is the likely range (average 7 days).
- **Common symptoms:** The most common symptom of cryptosporidiosis is profuse and watery diarrhea associated with abdominal pain. Other signs and symptoms include weight loss, stomach cramps, nausea, vomiting, and low-grade fever. In people with competent immune systems, symptoms may wax and wane but generally subside after approximately 30 days. Asymptomatic infections are common and serve as a source of infection for others.
- **Treatment:** No treatment other than rehydration, when indicated, has been proven to be effective.

### C. Reservoirs

Humans, cattle, and other domestic animals are reservoirs.

### D. Modes of Transmission

The most common mode of transmission is person-to-person. Infected animals and people excrete large numbers of oocysts in stool. Persons become infected by hand-to-mouth transfer of oocysts from the feces of an infected individual, especially in institutions and daycare centers. Zoonotic transmission can occur through contact with feces from infected animals (for livestock handlers, dairy farmers, veterinarians, etc.). Outbreaks have been associated with public drinking water supplies and recreational water use including waterslides, swimming pools, and lakes that are contaminated by human and animal feces. Outbreaks have also occurred from eating food contaminated with animal feces (e.g., unpasteurized apple cider that was contaminated with cow manure). An infected food worker could also be a source for foodborne transmission.

**E. Period of Communicability**

The disease is communicable for as long as the infected animal or person excretes oocysts in stool. This generally begins at the onset of symptoms and continues for several weeks after symptoms have resolved. Oocysts can remain infective outside the body in a moist environment for 2 - 6 months.

## 2) ACTIONS REQUIRED/CONTROL MEASURES

### A. Reporting Requirements

Cryptosporidiosis is physician reportable by mail within 12 hours of recognition or strong suspicion to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). The director of any clinical laboratory must also report laboratory evidence of cryptosporidiosis to both the DPH and the LHD. See current lists of physician Reportable Diseases (Attachment A) and Laboratory Reportable Significant Findings (Attachment C).

### B. Case Definition

- **Confirmed Case:**

- Evidence of *Cryptosporidium* organism or DNA in stool, intestinal fluid, tissue samples, biopsy specimens, or other biological sample by certain laboratory methods with a high positive predictive value (PPV), e.g.,
  - Direct fluorescent antibody [DFA] test,
  - Polymerase chain reaction [PCR],
  - Enzyme immunoassay [EIA], OR
  - Light microscopy of stained specimen.
- The detection of *Cryptosporidium* antigen by a screening test method such as immunochromatographic card/rapid card test (e.g. enzyme-linked immunosorbent assay); or a laboratory test of unknown method.

### C. Case Investigation

- **DPH Responsibility:** DPH is available to the LHD for assistance, consultation, and guidance and to ensure that appropriate investigative and control actions are being taken.
- **LHD Responsibility:** Using the “General Enteric Diseases Interview Form” (Attachment F), interview case and identify individuals in high-risk occupations or settings (see below). Completed GEDIF forms should be entered directly into Maven or faxed to the DPH at 860-509-7910.

Provide information and educational materials describing the nature of the disease and preventive measures. The importance of frequent and thorough hand washing should be stressed for all cases and contacts. Encourage a physician visit if symptoms persist.

### D. Control Measures

- **Food Handler:** Individuals with laboratory-confirmed infection should be excluded from direct food handling until they are asymptomatic. Exclusion of asymptomatic individuals is indicated only for those with questionable hygienic habits. Proper hand washing should be stressed.
- **Health Care Worker with Direct Patient Contact:** Individuals with laboratory-confirmed infection should be excluded from direct care of patients until they are asymptomatic.

Exclusion of asymptomatic individuals is indicated only for those with questionable hygienic habits. Proper hand washing should be stressed.

- **Day Care Setting:** Children or staff with laboratory-confirmed infections should be excluded until no longer symptomatic. Improved sanitation and personal hygiene should be emphasized. Proper hand washing by staff and children should be stressed, especially after using the toilet or handling soiled diapers.
- **Household Contacts:** Household contacts with diarrhea should be evaluated and tested for cryptosporidiosis and excluded from food handling and the care of children and/or patients until asymptomatic. Proper hand washing should be stressed.

## Fact Sheet

### What is cryptosporidiosis?

Cryptosporidiosis is an intestinal illness caused by a one-cell parasite called *Cryptosporidium parvum*.

### Where are *Cryptosporidium* parasites found?

*Cryptosporidium* parasites live in the intestines of infected people, cattle, and other domestic animals (e.g., cats and dogs).

### How does this parasite spread?

The *Cryptosporidium* parasite is passed in the stool of an infected person or animal as an oocyst (egg). Ingestion of only a few oocysts in contaminated food or water can make a person ill. Person-to-person and animal-to-person transmission can occur.

### Who gets cryptosporidiosis?

People who are most likely to become infected with *Cryptosporidium* include the following: children who attend day care centers, including diaper-aged children; child care workers; parents of infected children; international travelers; backpackers, hikers, and campers who drink unfiltered, untreated water; swimmers who swallow water while swimming in swimming pools, lakes, rivers, ponds, and streams; people who drink from shallow, unprotected well; and people who swallow water from contaminated sources.

### What are the symptoms of cryptosporidiosis?

Frequent, nonbloody, watery diarrhea is the most common symptom of cryptosporidiosis. The diarrhea is associated with cramping abdominal pain. Fever, loss of appetite, nausea, and vomiting occur less often. Some infected persons may not have any symptoms.

### How soon do symptoms appear?

The symptoms may begin 2 - 10 days after exposure (average 7 days).

### How long can an infected person carry *Cryptosporidium*?

Oocysts, the infectious stage, will appear in the stool at the onset of symptoms and can continue to be passed in the stool for several weeks after symptoms end.

### What is the treatment for cryptosporidiosis?

There is no specific treatment. When indicated, rehydration has proven to be effective. It is a self-limiting illness in people with healthy immune systems.

**What can be done to prevent the spread of cryptosporidiosis?**

Some important preventive measures are:

- Thoroughly wash hands after toilet visits and before eating or handling food.
- Wash all fruits and vegetables thoroughly, especially those that will not be cooked.
- Avoid consuming improperly filtered water from rivers, lakes, water parks, or swimming pools.
- Wash hands after contact with calves and other animals with diarrhea.
- Immunocompromised persons may consider boiling drinking water for 1 minute or using a water filter. Only filters capable of removing particles 0.1-1.0  $\mu\text{m}$  in diameter should be considered. Chemical disinfectants are not effective against oocysts.
- Persons at increased risk should avoid sexual practices that involve possible contact with stool.

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## 1) THE DISEASE AND ITS EPIDEMIOLOGY

### A. Etiologic Agent

*Cyclospora* infection is caused by *Cyclospora cayetanensis*, a one-cell parasite first associated with human disease in 1979. Humans with cyclosporiasis shed the parasite in a non-infectious form that takes from several days to a couple of weeks to mature (sporulate) into its infectious form. The time required for maturation to the infectious form depends on factors such as temperature and moisture.

### B. Description of Illness

- **General facts:** Historically, *Cyclospora* infection was usually found in people who lived or traveled in developing countries; however, the parasite seems to be widely distributed throughout the world. Outbreaks follow a seasonal pattern, with a predominant number of cases occurring during the warmer months.
- **Occurrence:** Individuals at all ages are at risk of infection. The largest documented outbreaks of cyclosporiasis in the United States and Canada occurred during the summers of 1996 and 1997 and were associated with consumption of imported raspberries.
- **Incubation period:** About 1 week after exposure.
- **Common symptoms:** Watery diarrhea with frequent (sometimes explosive) bowel movements. Other symptoms may include loss of appetite, weight loss, bloating, gas, stomach cramps, nausea, vomiting, muscle aches, low-grade fever, and fatigue. Occasionally, infected individuals may not have any symptoms. In people with competent immune systems, diarrhea is self-limiting but has been known to persist from 9 - 43 days. Immunodeficient persons may experience diarrhea for months. Untreated persons may have protracted, remitting, and relapsing symptoms, and weight loss can be significant.
- **Treatment:** Cyclosporiasis can be treated with a 7-day course of oral trimethoprim-sulfamethoxazole (for adults, 160 mg trimethoprim plus 800 mg sulfamethoxazole twice daily; for children, 5 mg/kg trimethoprim plus 25 mg/kg sulfamethoxazole twice daily). Treatment regimens for patients who cannot tolerate sulfa drugs have not been identified.

### C. Reservoirs

Humans are the only known reservoir for *Cyclospora cayetanensis*.

### D. Modes of Transmission

Current knowledge of cyclosporiasis suggests that it is not transmitted directly from person-to-person. The infective stage of the parasite is not present in freshly passed stool. After being shed in human stool, the parasite must undergo developmental changes (lasting days or weeks) before becoming infectious. Humans become infected by consuming food and water contaminated with human feces containing *Cyclospora*. Foodborne transmission has been indicated in outbreaks from consumption of contaminated produce (e.g., raspberries, basil, lettuce).

**E. Period of Communicability**

People who are actively ill may shed *Cyclospora* parasites for a few days to over one month. It is not known how long organisms are shed in stool once symptoms have stopped. A study of Peruvian children with cyclosporiasis indicated a mean duration of organism shedding was 23 days.

## 2) ACTIONS REQUIRED/CONTROL MEASURES

### A. Reporting Requirements

Cyclosporiasis is physician reportable by mail within 12 hours of recognition or strong suspicion to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). The director of any clinical laboratory must also report laboratory evidence of cyclosporiasis to both the DPH and the LHD. See current lists of physician Reportable Diseases (Attachment A) and Laboratory Reportable Significant Findings (Attachment C).

### B. Case Definition

- **Confirmed Case:** Demonstration of *Cyclospora* oocysts (by morphologic criteria or by demonstration of sporulation) or *Cyclospora* DNA (by polymerase chain reaction) in stool, duodenal/jejunal aspirates or small-bowel biopsy specimens.

### C. Case Investigation

- **DPH Responsibility:** DPH is available to the LHD for assistance, consultation, and guidance and to ensure that appropriate investigative and control actions are being taken.

The DPH, through FoodNet/FoodCORE, will interview all cases. Interviews include food and travel histories in an attempt to identify a source of infection and to identify individuals in high-risk occupations or settings (food handler, health care worker with direct patient contact, day care settings).

- **LHD Responsibility:** If the case is in a high-risk occupation or setting, the LHD will implement control measures.

### D. Control Measures

- **Food Handler:** Individuals with laboratory-confirmed infection should be excluded from direct food handling until they are asymptomatic. Exclusion of asymptomatic individuals is indicated only for those with questionable hygienic habits. Proper hand washing should be stressed.
- **Health Care Worker with Direct Patient Contact:** Individuals with laboratory-confirmed infection should be excluded from direct care of patients until they are asymptomatic. Exclusion of asymptomatic individuals is indicated only for those with questionable hygienic habits. Proper hand washing should be stressed.
- **Day Care Setting:** Children or staff with laboratory-confirmed infections should be excluded until no longer symptomatic. Improved sanitation and personal hygiene should be emphasized. Proper hand washing by staff and children should be stressed, especially after using the toilet or handling soiled diapers.

- **Household Contacts:** Household contacts with diarrhea should be evaluated and tested for cyclosporiasis and excluded from food handling and the care of children and/or patients until asymptomatic. Proper hand washing should be stressed.

## Fact Sheet

### What is cyclosporiasis?

Cyclosporiasis is an intestinal illness caused by *Cyclospora cayetanensis*, a one-cell parasite. The majority of cases are seen in the warmer months. In the last several years, outbreaks of the illness have been reported in the United States and Canada.

### Where are *Cyclospora* parasites found?

*Cyclospora* is only known to be found in infected humans. The parasites are passed in the stool of an infected person.

### How does this parasite spread?

*Cyclospora* is spread by people ingesting food or water that was contaminated with infected stool. Outbreaks of cyclosporiasis have been linked to various types of fresh produce. The parasite needs days or weeks after being shed in stool to become infectious, so it is unlikely that *Cyclospora* is passed directly from one person to another.

### Who gets cyclosporiasis?

People of all ages are at risk for *Cyclospora* infection. In the past, cyclosporiasis was usually found in people who lived or traveled in developing countries. More recently, it is known that people can be infected worldwide, including the United States.

### What are the symptoms of cyclosporiasis?

Cyclosporiasis infects the small intestine and usually causes watery diarrhea, with frequent (sometimes explosive) bowel movements. Other symptoms may include loss of appetite, weight loss, bloating, gas, stomach cramps, nausea, vomiting, muscle aches, low-grade fever, and fatigue. Some infected persons may not have any symptoms.

### How soon do symptoms appear?

The symptoms generally appear about a week after becoming infected.

### How long can an infected person carry *Cyclospora*?

Generally, infected people can pass the parasite in their stool for a few days to a month or longer.

### What is the treatment for cyclosporiasis?

A combination of two antibiotics is used to treat cyclosporiasis. People who have diarrhea should rest and drink plenty of fluids.

**How can cyclosporiasis be prevented?**

- Thoroughly wash hands after toilet visits and before eating or handling food.
- Wash all fruits and vegetables thoroughly, especially those that will not be cooked; however, this practice may not completely eliminate the risk of *Cyclospora*.
- Avoid consuming improperly filtered water from rivers, lakes, water parks, or swimming pools.

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## 1) THE DISEASE AND ITS EPIDEMIOLOGY

### A. Etiologic Agent

*Giardia* is the protozoan that causes giardiasis, an infection principally of the upper small intestine. *Giardia lamblia* is the most common cause of the disease in humans; *G. intestinalis* and *G. duodenalis* are rare.

### B. Description of Illness

- **General facts:** Giardiasis is associated with drinking water from unfiltered surface water sources or shallow wells, swimming in bodies of fresh water, and having a young family member in day care. Concentrations of chlorine used in routine water treatment do not kill *Giardia* cysts, especially when water is cold. Infected persons may be treated with antimicrobial medications.
- **Occurrence:** During the past 2 decades, *Giardia* infection has become recognized as one of the most common causes of waterborne disease (found in both drinking and recreational water) in humans in the United States. It most commonly occurs July through October among children less than 5 years of age and adults 25 - 39 years old.
- **Incubation period:** From 1 – 2 weeks after exposure (average 7 days).
- **Common symptoms:** Diarrhea, abdominal cramps, bloating, excessive amounts of gas in the stomach, fatigue, and weight loss can occur. Asymptomatic infections also occur. Persons with AIDS may have more serious and prolonged infection.
- **Treatment:** 5-nitroimidazoles: one daily dose of 2 grams metronidazole (children 15 mg/kg) for 3 days, or tinidazole 2 grams in a single dose (children 50 - 75 mg/kg) are the drugs of choice. Furazolidone is available in pediatric suspension for young children and infants (2 mg/kg thrice daily for 7 – 10 days). Paramomycin can be used during pregnancy, but when disease is mild, delay of treatment till after delivery is recommended. Drug resistance and relapses may occur with any drug.

### C. Reservoirs

Humans are the main reservoir, but beaver and other wild and domestic animals are possible reservoirs as well. Unfiltered stream and lake waters open to contamination by human and animal feces are a source of infection.

### D. Modes of Transmission

Primarily fecal-oral transmission; person-to-person transmission (especially in institutions and day care settings) is the most likely cause of spread. Anal intercourse facilitates transmission. Ingestion of *Giardia* cysts via fecally contaminated drinking and recreational water, and less commonly food, may cause outbreaks.

### E. Period of Communicability

Giardiasis is communicable throughout the course of infection, which is often months.

## 2) ACTIONS REQUIRED/CONTROL MEASURES

### A. Reporting Requirements

Giardiasis is laboratory reportable by mail to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). See current list of Laboratory Reportable Significant Findings (Attachment C).

### B. Case Definition

- **Confirmed Case**
  - Detection of *Giardia* organisms, antigen, or DNA in stool, intestinal fluid, tissue samples, biopsy specimens or other biological sample.

### C. Case Investigation

- **DPH Responsibility:** DPH is available to the LHD for assistance, consultation, and guidance and to ensure that appropriate investigative and control actions are being taken.
- **LHD Responsibility:** Using the “General Enteric Diseases Interview Form” (Attachment F), interview case and identify individuals in high-risk occupations or settings (see below).

Provide information and educational materials describing the nature of the disease and preventive measures. The importance of frequent and thorough hand washing should be stressed for all cases and contacts. Encourage a physician visit if symptoms persist.

### D. Control Measures

- **Food Handler:** Individuals with laboratory-confirmed infection should be excluded from direct food handling until they are asymptomatic. Exclusion of asymptomatic individuals is indicated only for those with questionable hygienic habits. Proper hand washing should be stressed.
- **Health Care Worker with Direct Patient Contact:** Individuals with laboratory-confirmed infection should be excluded from direct care of patients until they are asymptomatic. Exclusion of asymptomatic individuals is indicated only for those with questionable hygienic habits. Proper hand washing should be stressed.
- **Day Care Setting:** Children and staff with diarrhea should be excluded from day care until they are asymptomatic. Identify and culture other day care attendees and staff with diarrhea. Exclusion of asymptomatic carriers is not recommended; treatment of such carriers has not been demonstrated to be effective in outbreak control. **Improved sanitation and personal hygiene should be emphasized in day care settings.** Proper hand washing by staff and children should be stressed, especially before handling food or eating, and after using the toilet or handling soiled diapers.
- **Household Contacts:** Household contacts with diarrhea should be excluded from food handling and the care of children and/or patients until they are asymptomatic. Exclusion

of asymptomatic individuals is indicated only for those with questionable hygienic habits. Proper hand washing should be stressed.

## Fact Sheet

### What is giardiasis?

Giardiasis is an intestinal illness caused by a one-cell parasite called *Giardia lamblia*. It is a fairly common cause of diarrhea. Cases may occur as a single case, in clusters, or in outbreaks.

### Where are *Giardia* parasites found?

*Giardia* parasites are found in infected people (with or without symptoms) and wild or domestic animals including pets such as dogs and cats. Beavers have gained attention as a potential source of *Giardia* contamination of lakes, reservoirs, and streams.

### How does this parasite spread?

The *Giardia* parasite is passed in the stool of an infected person or animal and may contaminate water or food. Ingesting the parasite may cause illness. Person-to-person transmission may also occur in households, day care centers, or other settings where hand-washing practices are poor.

### Who gets giardiasis?

Anyone can get giardiasis, but it tends to occur more often in people in institutional settings, people in day care centers, parents of infected children, foreign travelers, and individuals who consume improperly treated surface water.

### What are the symptoms of giardiasis?

People exposed to *Giardia* may experience mild or severe diarrhea, cramps, bloating, excessive amounts of gas in the stomach; in some instances no symptoms may be present. Occasionally, some people will have chronic diarrhea over several weeks or months, with significant weight loss. Fever is rarely present.

### How soon do symptoms appear?

The symptoms appear 1 – 2 weeks after exposure (average 7 days).

### How long can an infected person carry the *Giardia* parasite?

A person can shed the parasite in stool throughout the entire period of infection, from weeks to months.

### Should an infected person be excluded from work or school?

People with active diarrhea (e.g., infants, young children, individuals with bowel control/hygiene issues) may need to be excluded from settings such as day care, and occupations such as food handling or direct patient care, until they no longer have diarrhea.

**What is the treatment for giardiasis?**

Several prescription drugs are available to treat a *Giardia* infection. Treatment of carriers without symptoms is generally not recommended. Some individuals may recover on their own, without medication.

**How can giardiasis be prevented?**

Some important preventive measures include:

- Carefully wash hands thoroughly after toilet visits and before eating or handling food.
- Wash hands after every diaper change, especially if you work with diaper-aged children, even if you are wearing gloves.
- Avoid consuming water from recreational use areas (e.g., rivers, lakes, ponds) and improperly treated drinking water.
- Avoid sexual practices that involve possible contact with stool.

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## 1) THE DISEASE AND ITS EPIDEMIOLOGY

### A. Etiologic Agent

Hemolytic uremic syndrome (HUS) is a serious illness involving the kidneys and blood clotting mechanisms. The most common cause of HUS is infection with *E. coli* O157:H7 bacteria. Less commonly, infection with other Shiga toxin-producing *E. coli* and *Shigella dysenteriae* may cause HUS.

### B. Description of Illness

- **General facts:** HUS is a rare but serious disease that often requires prolonged hospitalization. Diagnosis is based on several laboratory tests and medical evaluation. Supportive treatment (e.g., dialysis, transfusions) is often necessary for severe cases.
- **Occurrence:** HUS is most common in children less than 10 years old, where it occurs in about 5 - 10% of *E. coli* O157:H7 infections. Children less than 5 years of age are at greatest risk of developing HUS.
- **Incubation period:** Usually about 3 to 10 days after the onset of diarrhea. Diarrhea may have resolved, and the case may appear to be improving when the onset of HUS occurs.
- **Common symptoms:** Most cases of HUS follow an acute diarrheal illness and are characterized by acute renal failure, low platelet count, and hemolytic anemia. Most people recover completely with kidney function returning to normal.
- **Treatment:** There is no known medical treatment that will prevent the development of HUS. Supportive treatment is provided for kidney function (dialysis) and blood clotting (transfusions).

### C. Reservoirs

See Shiga toxin-producing *Escherichia coli*.

### D. Modes of Transmission

See Shiga toxin-producing *Escherichia coli*.

### E. Period of Communicability

See Shiga toxin-producing *Escherichia coli*.

## 2) ACTIONS REQUIRED/CONTROL MEASURES

### A. Reporting Requirements

HUS is physician reportable by mail within 12 hours of recognition or strong suspicion to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). See current list of physician Reportable Diseases (Attachment A) and Laboratory Reportable Significant Findings (Attachment C).

### B. Case Definition

- **Confirmed Case:** An acute illness diagnosed as HUS or thrombotic thrombocytopenic purpura that meets the following laboratory criteria and began within 3 weeks after onset of an episode of acute or bloody diarrhea:

acute onset of anemia with microangiopathic changes (i.e., schistocytes, burr cells, or helmet cells) on peripheral blood smear and acute onset of renal injury evidence by either hematuria, proteinuria, or elevated creatinine level (i.e., > 1.0 mg/dL in a child < 13 years or > 1.5 mg/dL in a person aged > 13 years, or > 50% increase over baseline).

### C. Case Investigation

- **DPH Responsibility:** The DPH, through FoodNet/FoodCORE, will obtain epidemiological, clinical, and laboratory information from the hospital and/or through patient interview. The DPH will notify the LHD if the person is in a high-risk setting.
- **LHD Responsibility:** If the person is in a high-risk setting, the LHD will work with DPH to implement control measures (see below).

### D. Control Measures

- **Food Handler:** Individuals should be excluded from direct food handling until two consecutive negative stool cultures spaced at least 24 hours apart are obtained. If the person was treated with antibiotics, cultures should be collected at least 48 hours after last dose. Assess other food handlers working in the establishment for any gastrointestinal symptoms. Those with any symptoms should submit a stool specimen for testing and be excluded from work until results return negative. The importance of proper hand washing should be stressed.
- **Health Care Worker with Direct Patient Contact:** Individuals should be restricted from direct patient care until diarrhea ceases and two consecutive negative stool cultures spaced at least 24 hours apart are obtained. If person was treated with antibiotics, cultures should be collected at least 48 hours after last dose.
- **Day Care Setting:** Children and/or staff should be excluded from day care until diarrhea ceases and two consecutive negative stool cultures spaced at least 24 hours apart are obtained. If the person was treated with antibiotics, cultures should be collected at least

48 hours after last dose. Any other daycare attendees and/or staff with diarrhea should be identified and cultured.

Improved sanitation and personal hygiene should be emphasized in day care settings. Proper hand washing by staff and children should be stressed, especially after using the toilet or handling soiled diapers.

- **Household Contacts:** Household contacts with diarrhea should be excluded from food handling and care of children and/or patients until diarrhea ceases and two (2) consecutive negative stool cultures taken at least 24 hours apart are obtained. Asymptomatic household contacts involved in food handling or care of children and/or patients should have at least one stool specimen cultured. Stress good hand washing technique. Asymptomatic household contacts should not be restricted from work pending culture results.

## Fact Sheet

### What is hemolytic uremic syndrome?

Hemolytic uremic syndrome (HUS) is a rare but serious illness that affects the kidneys and blood clotting system. It is more common in children than in adults and may be mild or severe. In severe cases, kidney function is greatly reduced, and dialysis may be necessary. Abnormalities of the blood clotting system can cause a tendency to bleed, and the red blood count may be low (anemia). Transfusions are often needed in severe cases. Fortunately, most people with HUS recover completely, and kidney function returns to normal. However, a prolonged hospital stay is often required.

### What causes HUS?

In most cases, HUS is a serious complication of an intestinal Shiga toxin-producing *E. coli* infection (STEC), especially with *E. coli* O157:H7.

### How soon do symptoms appear?

Symptoms usually appear about 3 to 10 days after the onset of diarrhea. Diarrhea may have resolved, and the case may appear to be improving when the onset of HUS occurs.

### How is HUS infection diagnosed?

HUS cannot be diagnosed with a single laboratory test. Physicians use the results of several tests and their medical evaluation to determine if a person has HUS. These include tests of kidney function, blood clotting factors, and blood counts.

### What is the treatment for HUS?

There is no known medical treatment that will prevent the development of HUS. Fortunately, the majority of children will not develop this complication. For those that do, supportive treatment is provided for kidney function (dialysis) and blood clotting (transfusions).

### How can HUS be prevented?

- Since hamburger and ground beef may be contaminated with STEC known to cause HUS, cook ground beef thoroughly. Ground beef should be cooked to a temperature of 160 degrees F. If a thermometer is not used, the beef should be cooked until the meat is no longer pink, and juices run clear.
- Do not consume raw milk or unpasteurized dairy products.
- Avoid unpasteurized juices.
- Wash your hands after using the bathroom or changing diapers and before preparing or eating food.
- Do not drink or swallow water in lakes, ponds, or streams.
- Prevent cross contamination in food preparation areas by thoroughly washing hands, counters, cutting boards, and utensils after they touch raw meat. Never place cooked

- hamburgers or ground beef on the unwashed plate that held raw patties. Wash meat thermometers in between tests of patties that require further cooking.
- Wash all fruits and vegetables thoroughly, especially those that will not be cooked – even if they will be peeled.
  - Wash your hands immediately after contact with animals (especially cattle) or their environment when visiting farms or petting zoos.

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## 1) THE DISEASE AND ITS EPIDEMIOLOGY

### A. Etiologic Agent

Hepatitis A virus (HAV) is an RNA virus that causes illness of variable severity. It can cause liver disease and has a relatively low case-fatality rate. The diagnosis is confirmed by the demonstration of IgM antibodies against HAV in the serum of acutely or recently ill persons.

### B. Description of Illness

- **General facts:** In the United States, 33% of the general population will test positive for prior HAV infection. In outbreak situations, day care attendees and employees, men who have sex with men, and injecting drug users may be at higher risk than the general population. Severity of illness increases with age, but complete recovery with no recurrence or long-lasting effects is most common. Convalescence is often prolonged, but no chronic infection is known to occur.
- **Occurrence:** Worldwide (epidemic and sporadic), with tendency for cyclic recurrences.
- **Incubation period:** From 15 - 50 days (average 28 - 30 days).
- **Common symptoms:** Abrupt onset of fever, fatigue, anorexia, diarrhea, dark urine, abdominal discomfort; often followed within a few days by jaundice. HAV co-infection increases severity of liver complications (e.g., fulminant hepatitis) in case-patients with chronic liver disease caused by hepatitis B or hepatitis C (HBV or HCV) virus infection. HAV has a low case fatality rate (0.1 - 0.3%), but elevated (1.8%) for adults 50 years and older, and persons with chronic liver disease have increased risk of death.
- **Treatment:** There is no specific treatment for HAV infection. Post exposure prophylaxis (HAV vaccine or immune globulin, depending on a person's age and other medical factors) may prevent infection in persons exposed to HAV, and should be given as soon as possible. The efficacy of immune globulin or vaccine when administered more than 2 weeks after exposure has not been established.

### C. Reservoirs

Humans are the main reservoir for HAV. Chimpanzees and other non-human primates rarely serve as reservoirs. No source of infection is identified in almost half of all cases.

### D. Modes of Transmission

Person-to-person via the fecal-oral route is the most common mode of transmission. Transmission is common among close contacts of acute cases, and occurs sporadically in and among day care settings with diapered children, injecting and non-injecting drug users, and men who have sex with men. Common-source outbreaks have been linked to:

- Contaminated water
- Raw/undercooked mollusks from contaminated waters
- Food contaminated by infected food handlers
- Contaminated produce (e.g., lettuce, strawberries)
- Injecting and non-injecting drug use
- Rarely by transfusion of blood or clotting factor concentrates

**E. Period of Communicability**

Case-patients are most infectious 1 - 2 weeks before onset of symptoms to several days after onset of jaundice. Prolonged viral excretion in feces (up to 6 months) has been documented in some infants and children. Chronic shedding of HAV is not known to occur.

## 2) ACTIONS REQUIRED/CONTROL MEASURES

### A. Reporting Requirements

Hepatitis A infection is physician reportable by mail within 12 hours of recognition or strong suspicion to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). The director of any clinical laboratory must also report laboratory evidence of hepatitis A infection to both the DPH and LHD. Effective January 2006, laboratories are also required to send at least 0.5 mL of residual serum from positive hepatitis A IgM anti-HAV tests to the DPH Laboratory for subtyping. See current lists of physician Reportable Diseases (Attachment A) and Laboratory Report of Significant Findings (Attachment C).

### B. Case Definition

- **Confirmed Case:** An acute illness with a) discrete onset of symptoms and b) jaundice or elevated serum aminotransferase levels and immunoglobulin M (IgM) antibody to hepatitis A virus (anti-HAV) positive.

### C. Case Investigation

- **DPH Responsibility:** In order to screen out asymptomatic individuals with positive laboratory reports, DPH will contact the ordering physician to confirm that the patient has signs and symptoms of acute hepatitis and to make them aware that someone from the LHD will be contacting their patient for further follow-up. DPH will then notify the LHD of the above findings and provide additional recommendations for follow up, if needed.

The DPH is available to the LHD for assistance, consultation, guidance, and to ensure that appropriate investigative and control actions are being taken.

- **LHD Responsibility:** Interview the case to collect clinical and risk factor information and identify individuals in high-risk occupations or settings (see below). Complete the “*Viral Hepatitis A Case Report*” form (Attachment H), and the “*Case and Contact Management*” form (Attachment I). Completed forms should be scanned and uploaded to Maven or faxed to the DPH at 860-509-7910. Provide educational materials describing the nature of the disease and preventive measures. Encourage close contacts to see a physician for prophylaxis as indicated below.

### D. Control Measures

- **Food Handler:** Individuals with laboratory-confirmed infection should be excluded from handling any food until 7 days after onset of jaundice or 10 days after onset of symptoms (if jaundice is absent) and providing all symptoms have subsided. Identify any other establishments where the case is a food handler.

**Follow up with food establishment.** Interview all food handlers to evaluate and identify any further illness. Also focus on the availability of hand washing and bathroom facilities, on foods prepared and handled by the case, and on storage and distribution of prepared food. Post exposure prophylaxis (PEP) (see Box) is recommended for all other food handlers of the food establishment. Food establishment employees should be educated

on HAV (symptoms, mode of transmission, prevention). Stress that thorough hand washing is the most important measure in preventing transmission of the virus. All employees should be closely monitored for hepatitis-like symptoms. If symptoms develop, employees should be referred to a physician for evaluation and specific testing for HAV IgM antibody.

**PEP should be considered for patrons if:** a) the infected food handler is involved in the preparation of foods that were not subsequently heated; and b) deficiencies in personal hygiene of the infected individual are noted OR s/he has worked while ill with diarrhea; and c) PEP can be provided within 2 weeks after last exposure(s).

- **Health Care Worker with Direct Patient Care Duties:** Exclude individuals with laboratory-confirmed infection from direct patient care until 7 days after onset of jaundice or 10 days after onset of symptoms (if jaundice is absent) and providing all symptoms have subsided. Consider the possibility of PEP for patients who may have received dental/oral/mouth care from the infected individual, and PEP can be given within 2 weeks of last exposure.

- **Day Care Setting**

**In a day care setting where all children are not toilet trained:** PEP is recommended for employees and children in the facility when HAV infection is identified in any employee or child or in the household members of two or more of the enrolled children. During the 6 weeks after the last case is identified, new employees and children should also receive PEP.

**In a day care setting where all children are toilet trained:** If HAV is identified in an employee or child, PEP is recommended for employees in contact with the case-patient and children in the same room as the case-patient.

**If recognition of an outbreak in a day care setting is delayed by 3 or more weeks from the onset of the index case, or if illness has occurred in 3 or more families:** HAV is likely to have already spread widely. In this situation, PEP should be considered for the household contacts of day care attendees.

- **Close Contacts:** Close personal contacts (e.g., household members, sexual partners) of HAV case-patients should receive PEP within 2 weeks of last exposure. Testing of contacts for immunity to hepatitis A is not recommended because it adds unnecessary cost and may delay PEP.

**Box. Post exposure prophylaxis (PEP): summary of updated recommendations**

PEP should be given as soon as possible, within 2 weeks of exposure. The efficacy of PEP given more than 2 weeks after exposure has not been established.

Group	Recommended PEP
Healthy persons aged 12 months – 40 years	Single-antigen hepatitis A vaccine
Persons aged > 40 years	Immune globulin (IG); vaccine can be used if IG cannot be obtained
Children aged < 12 months, immunocompromised persons, persons who have chronic liver disease diagnosed, and persons for whom vaccine is contraindicated	Immune globulin (IG)

(Reference: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5641a3.htm>)

## Fact Sheet

### **What is hepatitis A?**

Hepatitis A is a liver disease caused by the hepatitis A virus.

### **Where is the hepatitis A virus found?**

Hepatitis A is found in the stool of persons infected with hepatitis A.

### **How does this virus spread?**

It is usually spread by putting something in the mouth that is contaminated with the virus. Hepatitis A can be carried on an infected person's hands and spread by person-to-person contact or by contaminated food or drink.

### **Who gets hepatitis A?**

Anyone can become infected with hepatitis A; however, infection occurs more frequently in school-aged children and young adults.

### **What are the symptoms of hepatitis A?**

Symptoms of hepatitis A infection may include fever, fatigue, poor appetite, diarrhea, and abdominal discomfort. Urine may become darker in color, and jaundice (yellowing of the skin and whites of the eyes) may occur. The disease is rarely fatal. Infants and young children tend to have very mild symptoms and are less likely to develop jaundice than older children and adults. There is no chronic infection with hepatitis A.

### **How soon do symptoms appear?**

The symptoms may appear 15 – 50 days after exposure (average 28 – 30 days).

### **How long is an infected person able to spread the virus?**

The contagious period begins approximately 2 weeks before the symptoms appear and continues for approximately 1 week after the onset of symptoms. Prolonged excretion of virus (up to 6 months) in children and infants has been documented.

### **What is the treatment for hepatitis A?**

There is no specific treatment for hepatitis A. However, people who have been exposed to the hepatitis A virus should receive a shot of hepatitis A vaccine or immune globulin (IG), depending on their age and other medical factors. This treatment may provide protection and minimize symptoms of hepatitis A infection if a person receives it within 2 weeks after exposure to the virus.

## How can hepatitis A be prevented?

- Always wash hands after using the bathroom or changing diapers and before preparing or eating food.
- Hepatitis A vaccine is the best protection and is recommended for all children 12 months of age and older in the United States. The vaccine is also recommended (before exposure to hepatitis A virus) for the following persons who are more likely to get hepatitis A virus infection or more likely to get seriously ill if they do get hepatitis A.
  - Travelers to countries with increased rates of hepatitis A (check with your doctor).
  - Men who have sex with men.
  - Injecting drug users.
  - Persons with chronic liver disease.
  - Persons with clotting factor disorders (such as hemophilia).

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## 1) THE DISEASE AND ITS EPIDEMIOLOGY

### A. Etiologic Agent

*Listeria monocytogenes* is a gram-positive, rod-shaped bacterium that causes listeriosis; human infections are usually caused by serovars 1/2a, 1/2b and 4b.

### B. Description of Illness

- **General facts:** Listeriosis is an important public health problem in the United States. Diagnosis of listeriosis is best made by routine bacterial culture of specimens from usually sterile sites such as blood or cerebrospinal fluid. Stool culture is not reliable because many persons have enteric colonization with *L. monocytogenes* without invasive disease.
- **Occurrence:** In the United States, an estimated 2,500 persons become seriously ill with listeriosis each year. Of these, 500 die. At increased risk are the following: pregnant women; newborns; persons with weakened immune systems; persons with cancer, diabetes or kidney disease; persons with AIDS; persons who take glucocorticosteroid medications; and the elderly. Healthy adults and children occasionally get infected with *Listeria*, but they rarely become seriously ill.
- **Incubation period:** Variable; outbreak cases have occurred 3 - 70 days following a single exposure to an implicated product (median incubation is estimated at 3 weeks).
- **Common symptoms:** A person with listeriosis has fever, muscle aches, and sometimes gastrointestinal symptoms such as nausea or diarrhea. If infection spreads to the nervous system, symptoms such as headache, stiff neck, confusion, loss of balance, or convulsions can occur. Infected pregnant women may experience only a mild, flu-like illness; however, infections during pregnancy can lead to miscarriage or stillbirth, premature delivery, or infection of the newborn.
- **Treatment:** Penicillin or ampicillin alone or together with aminoglycosides. For penicillin-allergic patients, trimethoprim-sulfamethoxazole or erythromycin is preferred. Cephalosporins, including third-generation cephalosporins, are not effective in the treatment of clinical listeriosis.

### C. Reservoirs

Soil is the main reservoir, as well as forage, water, mud, and silage. Other reservoirs include infected domestic and wild animals, fowl, and humans. Up to 10% of humans may have asymptomatic fecal carriage, and rates may be higher in slaughterhouse workers and in laboratory workers handling *L. monocytogenes*.

### D. Modes of Transmission

Outbreaks have been associated with ingestion of raw or contaminated milk, soft cheeses, vegetables, hot dogs, and ready-to-eat meats; sporadic cases can result from foodborne transmission as well. Transmission can also occur from mother to fetus in utero or during birth.

**E. Period of Communicability**

Infected persons can shed organisms in stool for several months, although person-to-person transmission is rare. Mothers of infected newborns may also shed in vaginal discharges and urine for 7-10 days after delivery, but rarely longer.

## 2) ACTIONS REQUIRED/CONTROL MEASURES

### A. Reporting Requirements

Listeriosis is physician reportable by mail within 12 hours of recognition or strong suspicion to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). The director of any clinical laboratory must also report laboratory evidence of listeriosis to both the DPH and the LHD. **Additional requirements:** Isolates of *L. monocytogenes* must be submitted to the DPH State Laboratory for confirmation. See current lists of physician Reportable Diseases (Attachment A) and Laboratory Reportable Significant Findings (Attachment C).

### B. Case Definition

- **Confirmed Case:** Isolation of *L. monocytogenes* from a normally sterile site (e.g., blood or cerebral spinal fluid, or, less commonly, joint, pleural, or pericardial fluid).

### C. Case Investigation

- **DPH Responsibility:** The DPH, through FoodNet/FoodCORE, will interview all cases of listeriosis.
- **LHD Responsibility:** If a cluster/outbreak situation is identified, the LHD will work with DPH to investigate and identify a common source of infection (e.g., raw or contaminated milk, soft cheeses, contaminated vegetables, ready-to-eat meats) and to implement control measures to prevent further exposure to that source.

## Fact Sheet

### What is listeriosis?

Listeriosis is a serious illness caused by a bacterium called *Listeria monocytogenes*.

### Where are the bacteria found?

The bacteria are found in soil and water. Animals can carry the bacteria without appearing ill.

### How do these bacteria spread?

Humans may become infected by eating contaminated foods. Vegetables can become contaminated from the soil or from manure used as fertilizer. Animals can contaminate foods of animal origin such as meats and dairy products. The bacteria have been found in raw foods, such as uncooked meats and vegetables, and in foods that become contaminated after processing, such as soft cheese and cold cuts at the deli counter. Unpasteurized (raw) milk or foods made from unpasteurized milk may contain the bacteria. Babies can be born with listeriosis if their mothers eat contaminated food during pregnancy.

### Who gets listeriosis?

The disease affects primarily pregnant women, newborns, the elderly, persons with weakened immune systems, cancer, diabetes, kidney disease, AIDS, and persons who take corticosteroid medications. Healthy adults and children occasionally get infected with *Listeria*, but they rarely become seriously ill.

### What are the symptoms of listeriosis?

Persons infected with *Listeria* may have fever, muscle aches, and sometimes nausea and diarrhea. Symptoms such as headache, stiff neck, confusion, loss of balance, or convulsions can also occur. Infected pregnant women may experience only a mild illness; however, infection during pregnancy can lead to premature delivery, infection of the newborn, or even stillbirth.

### How soon do symptoms appear?

The symptoms can appear from 3 - 70 days after exposure. In most cases, symptoms develop 3 weeks after exposure.

### What is the treatment for listeriosis?

When infection occurs during pregnancy, antibiotics given promptly to the pregnant woman can often prevent infection of the fetus or newborn. Babies with listeriosis receive the same antibiotics as adults, although a combination of antibiotics is often used until physicians are certain of the diagnosis. Even with prompt treatment, some infections result in death. This is particularly likely in the elderly and in persons with other serious medical problems.

### How can listeriosis be prevented?

General recommendations include the following:

- Thoroughly cook raw food from animal sources, such as beef, pork, or poultry.
- Wash raw vegetables thoroughly before eating.
- Keep uncooked meats separate from vegetables, cooked foods, and ready-to-eat foods.
- Avoid raw (unpasteurized) milk or foods made from raw milk.
- Wash hands, knives, and cutting boards after handling uncooked foods.

Recommendations for persons at high risk, such as pregnant women and persons with weakened immune systems, in addition to the recommendations listed above:

- Do not eat soft cheeses such as feta, Brie, Camembert, blue-veined cheeses, or Mexican-style cheeses such as queso blanco, queso fresco, and Panela, unless they have labels that clearly state they are made from pasteurized milk.
- Do not eat hot dogs, luncheon meats, or deli meats, unless they are reheated until steaming hot.

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## 1) THE DISEASE AND ITS EPIDEMIOLOGY

### A. Etiologic Agent

*Salmonella* is a gram-negative bacterium that causes illness in animals and in humans. The *Salmonella enterica* species affects humans. While there are approximately 200 different serotypes of *S. enterica* identified in the United States each year, *S. Enteritidis* and *S. Typhimurium* are the most common. (For information on *S. typhi* and *S. paratyphi*, see “Typhoid Fever”.)

### B. Description of Illness

- **General facts:** While many sources of infection are possible, temperature abuse of food during preparation and cross contamination during food handling are the most important risk factors for salmonellosis. A temporary carrier state may last for months, especially in infants. Antibiotics may not eliminate the carrier state and may lead to resistant strains or even more severe illness.
- **Occurrence:** About 5 million cases of salmonellosis occur in the United States annually. The incidence rate is highest in infants and young children. The majority of cases occur sporadically, but large outbreaks in health care facilities, day care centers, and restaurants have occurred, usually from contaminated food.
- **Incubation period:** Usually about 12 – 36 hours (ranges from 6 - 72 hours).
- **Common symptoms:** Diarrhea, nausea, headache, abdominal pain, fever, sometimes loss of appetite and vomiting. Death is rare except for the very young, very old, debilitated, or immunosuppressed.
- **Treatment:** For uncomplicated enterocolitis, none generally indicated except rehydration and electrolyte replacement with oral rehydration solution.

### C. Reservoirs

Domestic and wild animals are reservoirs, including livestock (e.g., cattle, poultry, swine) and pets such as baby chicks and ducklings, dogs, cats, birds (including pet birds), and reptiles (e.g., lizards, snakes, and turtles). Humans may serve as a reservoir, especially in mild and unrecognized cases as well as patients and convalescent carriers. Chronic carriers are rare in humans but prevalent in animals and birds.

### D. Modes of Transmission

*Salmonella* are usually transmitted to humans by eating foods contaminated with animal feces (e.g., beef, poultry, milk, or eggs), but all foods, including vegetables may become contaminated. Recent outbreaks have been traced to raw fruits and vegetables contaminated during slicing. Fecal-oral transmission is also important especially when diarrhea is present. Food may also become contaminated by the unwashed hands of an infected food handler, who forgot to wash his/her hands with soap after using the bathroom. Pets are also potential sources.

**E. Period of Communicability**

Persons may shed *Salmonella* throughout the course of infection (several days to weeks). Depending on serotypes, about 1% of infected adults and 5% of infected children under 5 years old may excrete the organism for over a year.

## 2) ACTIONS REQUIRED/CONTROL MEASURES

### A. Reporting Requirements

Salmonellosis is physician reportable by mail within 12 hours of recognition or strong suspicion to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). The director of any clinical laboratory must also report laboratory evidence of salmonellosis to both the DPH and the LHD. **Additional requirements:** Isolates must be submitted to the DPH State Laboratory for confirmation and serotyping. See current lists of physician Reportable Diseases (Attachment A) and Laboratory Reportable Significant Findings (Attachment C).

### B. Case Definition

- **Confirmed Case:** Isolation of *Salmonella* from any clinical specimen.

### C. Case Investigation

- **DPH Responsibility:** DPH is available to the LHD for assistance, consultation, and guidance and to ensure that appropriate investigative and control actions are being taken.
- **LHD Responsibility:** Using the “General Enteric Diseases Interview Form” (Attachment F), FoodCORE will interview the case (for LHDs that have deferred interviews) and identify individuals in high-risk occupations or settings (see below). Completed GEDIF forms will be/should be entered directly into Maven or faxed to the DPH at 860-509-7910.

Provide information and educational materials describing the nature of the disease and preventive measures. The importance of frequent and thorough hand washing should be stressed for all cases and contacts. Encourage a physician visit if symptoms persist.

### D. Control Measures

- **Food Handler:** Individuals with laboratory-confirmed infection should be excluded from direct food handling until two consecutive negative stool cultures spaced at least 24 hours apart are obtained. If treated with antibiotics, cultures should be collected at least 48 hours after last dose.

**Follow up with food establishment:** Assess other food handlers working in the establishment for any gastrointestinal symptoms. Those with gastrointestinal symptoms should submit a stool specimen for testing and be excluded from work until results return negative. The importance of proper hand washing should be stressed.

- **Health Care Worker with Direct Patient Contact:** Symptomatic individuals with laboratory-confirmed infection should be excluded from direct patient care until asymptomatic. Exclusion of asymptomatic cases is indicated for those with questionable hygienic habits. When exclusion is necessary, release to return to work generally requires two consecutive negative stool cultures spaced at least 24 hours apart. If treated with antibiotics, cultures should be collected at least 48 hours after the last dose.

- **Day Care Setting:** Exclude symptomatic children and employees with laboratory-confirmed infection until symptoms subside. Other children and employees with gastrointestinal symptoms should be identified and cultured. **Improved sanitation and personal hygiene should be emphasized in day care settings.** Proper hand washing by staff and children should be stressed, especially after using the toilet or handling soiled diapers.
- **Household Contacts:** Close contacts with gastrointestinal symptoms should be excluded from food handling until diarrhea ceases and two consecutive negative stool cultures taken at least 24 hours apart are obtained. Asymptomatic household contacts involved in food handling should have at least one negative stool culture. Stress good hand washing technique. Asymptomatic household contacts should not be excluded from work pending culture results.

Close contacts with gastrointestinal symptoms should be excluded from day care and care of patients until diarrhea ceases. Exclusion of asymptomatic contacts is indicated for those with questionable hygienic habits.

## Fact Sheet

### What is salmonellosis?

Salmonellosis is an illness that is caused by a bacterium called *Salmonella*. It is a common cause of diarrhea in the United States and one of the most common causes of food poisoning.

### Where are *Salmonella* bacteria found?

*Salmonella* bacteria may be present in certain food products such as raw meats, raw poultry, unpasteurized milk and cheese products, raw eggs, and in stool of infected persons. Other sources of exposure may include contact with infected reptiles (e.g., snakes, lizards, turtles), pet chicks, dogs, and cats.

### How do these bacteria spread?

*Salmonella* bacteria are spread by eating or drinking contaminated food or water and less often by contact with infected people or animals.

### Who gets salmonellosis?

Anyone can get salmonellosis, but it is recognized more often in infants and children.

### What are the symptoms of salmonellosis?

People infected with *Salmonella* may experience mild or severe diarrhea, fever, and occasionally vomiting.

### How soon do symptoms appear?

The symptoms generally appear from 12 - 36 hours after exposure (range 6 – 72 hours).

### How long can an infected person carry *Salmonella*?

An infected person can have *Salmonella* bacteria in the stool for several days to many months. Infants and people who have been treated with oral antibiotics tend to carry the germ longer than others.

### Should an infected person be excluded from work or school?

Since *Salmonella* bacteria are in the stool, people with active diarrhea who are unable to control their bowel habits (e.g., infants, young children, certain handicapped individuals) need to be isolated. Most infected people may return to work or school once diarrhea has stopped, provided they carefully wash their hands after toilet visits. Food handlers should have two negative stools, obtained at least 24 hours apart, before returning to their routine activities.

### What is the treatment for salmonellosis?

Most people infected with *Salmonella* will recover on their own; however, some may require fluids to prevent dehydration. Antibiotics and antidiarrheal drugs are generally not recommended for typical cases.

**How can salmonellosis be prevented?**

- Always treat raw poultry, beef, and pork as if they are contaminated:
  - Wrap fresh meats in plastic bags at the market to prevent blood from dripping on other foods.
  - Refrigerate foods promptly; minimize holding at room temperature.
  - Cutting boards and counters used for preparation should be washed well immediately after use to prevent cross contamination with other foods.
  - Ensure that the correct internal cooking temperature is reached – particularly when using a microwave.
- Avoid eating raw or undercooked meats.
- Avoid drinking or using raw milk.
- Avoid eating raw eggs, uncooked foods with raw eggs (i.e. cookie dough), or undercooked foods containing raw eggs.
- Encourage careful hand washing before and after food preparation.
- Make sure children, particularly those who handle pets, carefully wash their hands.
- Reptiles, or objects from reptile tanks, should not have contact with food preparation surfaces or play areas for young children.

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## 1) THE DISEASE AND ITS EPIDEMIOLOGY

### A. Etiologic Agent

*Escherichia coli* is a gram-negative bacterium. Although most strains are harmless and live in the intestines of healthy humans and animals, some produce a powerful toxin that can cause severe illness; these strains are called Shiga toxin-producing *E. coli* (STEC).

### B. Description of Illness

- **General facts:** While the most common STEC in North America are strains of the serotype O157:H7, other serotypes such as O26:H11, O111:H8, and O103:H2 have also been implicated in human illness. The infectious dose is very low.
- **Occurrence:** Infection is now recognized as an important problem in North America, South America, and Europe. An estimated 73,000 cases of infection and 61 deaths occur in the United States each year.
- **Incubation period:** Usually about 3 - 4 days after exposure (range 2 – 8 days).
- **Common symptoms:** Abdominal cramps, diarrhea (often bloody), sometimes vomiting, and a low-grade fever may occur. Asymptomatic infections can also occur. In young children and the elderly, the infection can cause a serious complication called hemolytic uremic syndrome (HUS), leading to kidney failure, or a condition called thrombotic thrombocytopenic purpura (TTP). Symptoms of uncomplicated infection usually resolve within 5 - 10 days. There is no evidence to suggest that treatment with antibiotics is helpful.
- **Treatment:** Reasonable concern exists that some antimicrobial agents increase the risk of HUS, although proof is lacking. Fluid replacement is the cornerstone of treatment for enterohemorrhagic *E. coli* diarrhea.

### C. Reservoirs

Cattle are the most important reservoir; however, other animals, such as a deer, may carry STEC. Humans may serve as a reservoir for person-to-person transmission.

### D. Modes of Transmission

Transmission occurs most often through ingestion of food contaminated with fecal matter, such as raw and/or undercooked beef (especially ground beef), raw (unpasteurized) milk and juice, and produce (sprouts, etc.). Waterborne transmission has occurred (swimming in or drinking contaminated water). Transmission from person-to-person is important in families, day care settings and institutional settings, especially when diarrhea is present.

### E. Period of Communicability

Infectious organisms are excreted throughout the course of infection, which is generally one week or less in adults, but a third of children can excrete organisms for 3 weeks. Prolonged asymptomatic carrier state is uncommon.

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## 2) ACTIONS REQUIRED/CONTROL MEASURES

### A. Reporting Requirements

O157:H7 infection and Shiga toxin-related disease are reportable by mail within 12 hours of recognition or strong suspicion to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). The director of any clinical laboratory must also report laboratory evidence of O157:H7 infection and Shiga toxin-related disease to both the DPH and the LHD. **Additional requirements:** O157 isolates and broth that yielded the positive Shiga toxin test must be submitted to the DPH State Laboratory for confirmation. See current lists of physician Reportable Diseases (Attachment A) and Laboratory Reportable Significant Findings (Attachment C).

### B. Case Definition

- **Confirmed Case:**
  - Isolation of *E. coli* O157:H7 from a clinical specimen,
  - Isolation of Shiga toxin-producing *E. coli* O157:NM from a clinical specimen,
  - Isolation of Shiga-toxin producing *E. coli* of any serotype from the broth of a stool specimen directly testing positive for Shiga-toxin.

### C. Investigation

- **DPH Responsibility:** The DPH, through FoodNet/FoodCORE, will interview all cases of STEC infection and will notify the LHD if a person is in a high-risk setting.
- **LHD Responsibility:** If a person in a high-risk setting, the LHD will work with DPH to implement control measures and/or investigate and identify a common source of infection.

### D. Control Measures

- **Food Handler:** Individuals with laboratory-confirmed infection should be excluded from direct food handling until two consecutive negative stool cultures spaced at least 24 hours apart are obtained. If the person was treated with antibiotics, cultures should be collected at least 48 hours after last dose. Assess other food handlers working in the establishment for any gastrointestinal symptoms. Those with any symptoms should submit a stool specimen for testing and be excluded from work until results return negative. The importance of proper hand washing should be stressed.
- **Health Care Worker with Direct Patient Contact:** Individuals with laboratory-confirmed infection should be restricted from direct patient care until diarrhea ceases and two consecutive negative stool cultures spaced at least 24 hours apart are obtained. If person was treated with antibiotics, cultures should be collected at least 48 hours after last dose.
- **Day Care Setting:** Symptomatic children and/or staff with laboratory-confirmed infection should be excluded from day care until diarrhea ceases and two consecutive negative

stool cultures spaced at least 24 hours apart are obtained. If the person was treated with antibiotics, cultures should be collected at least 48 hours after last dose. Any other daycare attendees and/or staff with diarrhea should be identified and cultured.

Improved sanitation and personal hygiene should be emphasized in day care settings. Proper hand washing by staff and children should be stressed, especially after using the toilet or handling soiled diapers.

- **Household Contacts:** Household contacts with diarrhea should be excluded from food handling, day care, and care of patients until diarrhea ceases and two (2) consecutive negative stool cultures taken at least 24 hours apart are obtained. Asymptomatic household contacts involved in food handling, day care, or care of patients should have at least one stool specimen cultured. Stress good hand washing technique. Asymptomatic household contacts should not be restricted from work pending culture results.

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## Fact Sheet

### **What are Shiga toxin-producing strains of *Escherichia coli*?**

*Escherichia coli* (*E. coli*) is a bacterium. Although most strains of this bacterium are harmless, some strains produce a powerful toxin that can cause illness. These strains are called Shiga toxin-producing *E. coli* (STEC). The most common STEC strain in North America is *E. coli* O157:H7.

### **Where are STEC bacteria found?**

STEC bacteria are normally found in the intestines of cattle; however, other animals such as deer may also carry STEC.

### **How do these bacteria spread?**

Because these bacteria are normally found in cattle, contamination of meat (especially ground beef) may occur during the slaughtering process. Eating contaminated meat that has not been thoroughly cooked can cause illness. In addition, outbreaks have been associated with consuming raw milk, unpasteurized apple cider, contaminated water, sprouts, lettuce, salami, and venison. Transmission also occurs directly from person-to-person, especially in families and in high-risk settings like daycare centers.

### **Who gets STEC infections?**

Although anyone can get infected, the highest infection rates are in children less than 5 years of age. The elderly are also at increased risk for infection.

### **What are the symptoms?**

Typical symptoms can include abdominal cramping, watery diarrhea, frequently bloody, vomiting, and a low-grade fever. Symptoms usually resolve over several days. Some individuals may experience no symptoms at all. The infection can cause a serious complication known as hemolytic uremic syndrome (HUS), especially in young children, in which the red blood cells are destroyed and the kidneys fail. Adults may also develop a similar complication along with neurologic symptoms, known as thrombotic thrombocytopenic purpura (TTP). These complications can occur in up to 10% of cases.

### **How soon do symptoms appear?**

The symptoms generally appear 3 to 4 days after the exposure (range 2 – 8 days).

### **Should an infected person be excluded from school or work?**

Young children in day-care settings known to have STEC should be removed from the day-care facility until two consecutive stool specimens have tested negative. School-aged children who have recovered from their illness may attend school. Persons who are employed as food handlers, health care workers, or childcare providers should also be excluded until they have two negative stool specimens.

**What is the treatment for STEC?**

Most people recover without any specific treatment. There is no evidence that antibiotic treatment is helpful. Antidiarrheal agents are also not recommended. Severe complications, such as HUS, usually require hospitalization.

**How can STEC infections be prevented?**

- Cook ground beef thoroughly. Ground beef should be cooked to a temperature of 160 degrees F. If a thermometer is not used, the beef should be cooked until the meat is no longer pink and juices run clear.
- Do not consume raw milk or unpasteurized dairy products.
- Avoid unpasteurized juices.
- Wash your hands after using the bathroom or changing diapers and before preparing or eating food.
- Do not drink or swallow water in lakes, ponds, or streams.
- Prevent cross contamination in food preparation areas by thoroughly washing hands, counters, cutting boards, and utensils after they touch raw meat. Never place cooked hamburgers or ground beef on the unwashed plate that held raw patties. Wash meat thermometers in between tests of patties that require further cooking.
- Wash all fruits and vegetables thoroughly, especially those that will not be cooked – even if they will be peeled.
- Wash your hands immediately after contact with animals (especially cattle) or their environment when visiting farms or petting zoos.

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## 1) THE DISEASE AND ITS EPIDEMIOLOGY

### A. Etiologic Agent

*Shigella* species are gram-negative bacilli. Infection may occur after the ingestion of very few (10-100) organisms. Four species have been identified. Among *Shigella* isolates reported in the United States from 1989 to 2000, 78% were *S. sonnei*, 19% were *S. flexneri*, 2% were *S. boydii*, and 1% were *S. dysenteriae*.

### B. Description of Illness

- **General facts:** Every year, about 18,000 cases of shigellosis are reported in the United States. Shigellosis is particularly common and causes recurrent problems in settings where hygiene is poor and can sometimes sweep through entire communities.
- **Occurrence:** Occurs worldwide; incidence is highest in young children. Secondary attack rates in households can be as high as 40%. Outbreaks usually occur in men who have sex with men, in over-crowded conditions, and in places where personal hygiene is poor (e.g., day care centers, jails). Shigellosis is more common in summer than winter.
- **Incubation Period:** Symptoms may appear 12 – 96 hours after exposure; usually within 1 – 3 days; up to 1 week for *S. dysenteriae*.
- **Common Symptoms:** Common symptoms include diarrhea (may contain blood and/or mucous, or may be watery), fever, and nausea.
- **Treatment:** Fluid and electrolyte replacement is important when diarrhea is watery or there are signs of dehydration. Antibiotics shorten the duration and severity of illness and the duration of pathogen excretion. They should be used in individual cases if warranted by the severity of illness or to protect contacts (e.g., in day care centers or institutions) when epidemiologically indicated. Multidrug resistance to most of the low-cost antibiotics is common, and the choice of specific agents will depend on the antibiogram of the isolated strain.

### C. Reservoirs

Humans are the significant reservoir; outbreaks have occurred in primate colonies as well.

### D. Modes of Transmission

Transmission is person-to-person through direct or indirect fecal-oral contact from a symptomatic patient or a short-term asymptomatic carrier. Secondary transmission in households is of concern and can reach 40%. Individuals primarily responsible for transmission are those who fail to use proper hand washing techniques (especially after using the bathroom) and transmit organisms to others directly by physical contact or indirectly by contaminating food.

### E. Period of Communicability

Shigellosis is communicable during the acute infection and until the infectious agent is no longer present in feces, usually within 4 weeks after illness. Asymptomatic carriers may transmit infection; rarely the carrier state may persist for months. Antibiotic treatment usually reduces duration of carriage to a few days. Secondary attack rates in households are common if precautions are not followed.

## 2) ACTIONS REQUIRED/CONTROL MEASURES

### A. Reporting Requirements

Shigellosis is physician reportable by mail within 12 hours of recognition or strong suspicion to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). The director of any clinical laboratory must also report laboratory evidence of shigellosis to both the DPH and the LHD. **Additional requirements:** Isolates of *Shigella* must be submitted to the DPH State Laboratory for confirmation. See current lists of physician Reportable Diseases (Attachment A) and Laboratory Reportable Significant Findings (Attachment C).

### B. Case Definition

- **Confirmed Case:** Isolation of *Shigella* from any clinical specimen.

### C. Case Investigation

- **DPH Responsibility:** DPH is available to the LHD for assistance, consultation, and guidance and to ensure that appropriate investigative and control actions are being taken.
- **LHD Responsibility:** Using the “General Enteric Diseases Interview Form” (Attachment F), interview the case and identify individuals in high-risk occupations or settings (see below). Completed GEDIF forms should be entered directly into Maven or faxed to the DPH at 860-509-7910.

Provide information and educational materials describing the nature of the disease and preventive measures. The importance of frequent and thorough hand washing should be stressed for all cases and contacts. Encourage a physician visit if symptoms persist.

### D. Control Measures

- **Food Handler:** Individuals with laboratory-confirmed infection should be excluded from direct food handling until two consecutive negative stool cultures spaced at least 24 hours apart are obtained. If treated with antibiotics, cultures should be collected at least 48 hours after last dose. Follow up with the food establishment and assess other food handlers working in the establishment for any gastrointestinal symptoms. Those with gastrointestinal symptoms should submit a stool specimen for testing and be excluded from work until results return negative. The importance of proper hand washing should be stressed.
- **Health Care Worker with Direct Patient Contact:** Individuals with laboratory-confirmed infection should be restricted from direct patient care until diarrhea ceases and two consecutive negative stool cultures spaced at least 24 hours apart are obtained. If the person was treated with antibiotics, cultures should be collected at least 48 hours after last dose.
- **Day Care Setting:** Symptomatic attendees and/or staff with laboratory-confirmed infection should be excluded from day care until diarrhea ceases and two consecutive negative stool cultures spaced at least 24 hours apart are obtained. If treated with

antibiotics, cultures should be collected at least 48 hours after last dose. Any other day care attendees and/or staff with diarrhea should be identified and cultured. **Improved sanitation and personal hygiene should be emphasized in day care settings.** Proper hand washing by staff and children (especially after using the toilet or handling soiled diapers) should be stressed, as hand hygiene is the most important measure to decrease transmission.

- **Household Contacts:** Household contacts with diarrhea should be excluded from food handling, day care, and care of patients until diarrhea ceases and two consecutive negative stool cultures taken at least 24 hours apart are obtained. Asymptomatic household contacts involved in food handling, day care, or care of patients should have at least one stool specimen cultured; stress good hand washing technique and recommend glove use. Asymptomatic household contacts should not be restricted from work pending culture results.

## Fact Sheet

**What is shigellosis?**

Shigellosis is a fairly common illness affecting the intestinal tract. It is caused by a bacterium called *Shigella*. Most cases are seen in the summer and early fall and occur as single cases or outbreaks.

**Where are *Shigella* bacteria found?**

*Shigella* can be found in the intestinal tract of infected people who in turn may contaminate food or water.

**How do these bacteria spread?**

*Shigella* bacteria are spread by eating or drinking contaminated food or water or by direct contact with an infected person. Infection may occur after ingestion of very few (10-100) organisms.

**Who gets shigellosis?**

Anyone can get shigellosis, but it is recognized more often in young children. Those who may be at greater risk include children in day care centers, foreign travelers to certain countries, institutionalized people, and active homosexuals.

**What are the symptoms of shigellosis?**

People infected with *Shigella* may experience mild or severe diarrhea often with fever, nausea, and sometimes cramps and vomiting. Traces of blood or mucous in the stool can be found in typical cases. Some infected people may show mild illness or no symptoms.

**How soon do symptoms appear?**

The symptoms usually appear 1 – 3 days after exposure (range 12 – 96 hours).

**How long can an infected person carry *Shigella*?**

People can pass *Shigella* in their stool for up to 4 weeks. Certain antibiotics may shorten the carrier phase.

**Should an infected person be excluded from school or work?**

Since *Shigella* is passed in the stool of an infected person, those with active diarrhea or those who are unable to control their bowel habits should be excluded from work or school. Most infected people may return to work or school after the diarrhea ends, provided they carefully wash their hands after toilet visits. Because of the extremely small infective dose, food handlers and persons who provide direct patient care should have two consecutive negative stool samples before returning to regular work activities. Day care attendees should receive antimicrobial therapy and should not return to the day care center until the diarrhea has ceased and two consecutive stool samples are negative for *Shigella*.

**What is the treatment for shigellosis?**

Most people with shigellosis will recover on their own. Some may require fluids to prevent dehydration. Antibiotics are occasionally used to treat severe cases or to shorten the carrier phase which may be important for food handlers, children in day care, or institutionalized individuals.

**How can shigellosis be prevented?**

- Wash hands with soap and water carefully and frequently, especially after going to the bathroom, after changing diapers, and before preparing foods or beverages.
- Dispose of soiled diapers properly; disinfect diaper-changing areas after using them.
- Keep children with diarrhea out of child care settings.
- Persons with diarrhea should not prepare food for others.
- Avoid sexual practices that result in contact with feces.

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## 1) THE DISEASE AND ITS EPDEMOLOGY

### A. Etiologic Agent

Trichinosis is a parasitic disease caused by intestinal round worms whose larvae migrate to and become encapsulated in the muscles. Of the several *Trichinella* species identified, *T. spiralis* is the most common cause of human infection.

### B. Description of Illness

- **General facts:** Severity of illness is highly variable and depends on the amount of larvae ingested. Clinical spectrum of disease ranges from unapparent infection (most common) to fulminating, fatal disease. Specific drug treatments are effective in the intestinal and muscular stage.
- **Occurrence:** Worldwide; incidence varies. Cases are usually sporadic and outbreaks localized.
- **Incubation period:** Usually 1 – 2 weeks. Gastrointestinal symptoms may appear within a few days. Systemic symptoms appear about 8-15 days after ingestion of infected meat, but can vary between 5 and 45 days depending on number of parasites.
- **Common symptoms:** Nausea, diarrhea, vomiting, fatigue, and abdominal discomfort may precede headache, fever, joint pain and muscle soreness, hives, light sensitivity, swelling of the eyelids, and constipation. Rarely, due to heavy infection, cardiac and/or neurologic complications could appear weeks into the infection; in severe cases, death by myocardial failure may occur.
- **Treatment:** Albendazole or mebendazole are effective in the intestinal stage and in the muscular stage. Corticosteroids are indicated only in severe cases to alleviate symptoms of inflammatory reaction when the central nervous system or heart is involved; however, they delay elimination of adult worms from the intestine.

### C. Reservoirs

A number of animals serve as reservoirs for *Trichinella*, including swine, dogs, cats, horses, rats, and many wild animal species (such as wolf, bear, fox, wild boar, and marine mammals).

### D. Modes of Transmission

Transmission is foodborne and occurs through ingestion of raw or insufficiently cooked flesh of animals containing encysted *Trichinella* larvae; chiefly pork, pork products and beef products (such as hamburgers mixed with raw pork). As many as 30% of domestic cases may be attributed to ingestion of wild game meat.

### E. Period of Communicability

Not transmitted directly person-to-person. Animal hosts remain infective for months, and meat from such animals stays infective for long periods of time unless cooked, frozen, or irradiated to kill the larvae.

## 2) ACTIONS REQUIRED/CONTROL MEASURES

### A. Reporting Requirements

Trichinosis is physician reportable by mail within 12 hours of recognition or strong suspicion to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). The director of any clinical laboratory must also report laboratory evidence of trichinosis to both the DPH and the LHD. See current lists of physician Reportable Diseases (Attachment A) and Laboratory Reportable Significant Findings (Attachment C).

### B. Case Definition

- **Confirmed Case:**
  - Demonstration of *Trichinella* larvae in tissue obtained by muscle biopsy or
  - Positive serologic test for *Trichinella*.

### C. Case Investigation

- **DPH Responsibility:** The DPH will conduct the following activities: contact the testing laboratory and the patient's physician to confirm the diagnosis of trichinosis; interview the patient to collect food history during incubation period (5 – 45 days before symptom onset); specifically inquire about consumption of pork and pork products, other high-risk foods such as wild game meat and dried jerky, and methods of preparation; assess other household members and persons who have eaten suspected meat (if any) for evidence of infection; and confiscate any remaining suspected food and consult CDC about testing.
- **LHD Responsibility:** If a cluster/outbreak is identified, the LHD will work with the DPH to implement control measures. Provide information and educational materials describing the nature of the disease and preventive measures.

## Fact Sheet

### What is trichinosis?

Trichinosis is an illness caused by a very small parasite called *Trichinella spiralis*.

### Where is the parasite found?

Animals such as pigs, dogs, cats, horses, rats, and many wild animals including, wolf, bear, fox, and some sea mammals such as walrus carry the parasite.

### How does the parasite spread?

The usual source of human infection is eating raw or undercooked meats, particularly pork, but horsemeat and wild animal meat can also be sources. The disease does not spread from person-to-person.

### Who gets trichinosis?

Anyone who eats undercooked meat of infected animals can develop trichinosis.

### What are the symptoms of trichinosis?

Nausea, diarrhea, vomiting, fatigue, and abdominal discomfort are the first symptoms of trichinosis. Headache, fever, chills, cough, eye swelling, aching joints and muscle pains, itchy skin, or constipation follow the first symptoms. If the infection is severe, patients may experience difficulty coordinating movements, and have heart and breathing problems.

### How soon do symptoms appear?

Abdominal symptoms can occur 1 - 2 days after infection. Further symptoms usually occur 8-15 days after eating contaminated meat.

### What is the treatment for trichinosis?

Several safe and effective prescription drugs are available to treat trichinosis.

### How can trichinosis be prevented?

- Cook all fresh pork, pork products, and meat from wild animals at a temperature and for a time sufficient to allow all parts to reach at least 160°F.
- Freeze pork less than 6 inches thick for 20 days at 5°F to kill any parasites. Freezing wild game meats, unlike freezing pork products, even for long periods of time, may not kill all parasites.
- Cook all meat fed to pigs or other wild animals.
- Do not allow pigs to eat uncooked carcasses of other animals, including rats, which may be infected with parasites.
- Clean meat grinders thoroughly if you prepare your own ground meats.
- Curing (salting), drying, smoking, or microwaving meat does not always kill the parasites.

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## 1) THE DISEASE AND ITS EPIDEMIOLOGY

### A. Etiologic Agent

*Salmonella enterica* serotype Typhi (abbreviated *S. typhi*) is a gram-negative bacillus that causes typhoid fever, a systemic bacterial disease. *Salmonella enterica* serotypes Paratyphi A, Paratyphi B, and Paratyphi C cause a similar illness called paratyphoid fever, but this illness tends to be milder and has a lower case-fatality rate than typhoid fever.

### B. Description of Illness

- **General facts:** In the United States, about 400 cases occur each year, and 70% of these are acquired while traveling internationally. Typhoid fever is still common in the developing world, where it affects about 12.5 million persons each year. Travelers to countries where typhoid is common should consider being vaccinated against typhoid.
- **Occurrence:** Worldwide. Susceptibility to invasive infections is increased in infants, the elderly, and individuals who are immunocompromised. In the United States, infection with *S. typhi* implies direct contact with an infected person or with an item contaminated by a carrier.
- **Incubation period:** Depends on size of the infecting dose, symptoms generally appear from 8 – 14 days after exposure (range 3 days to 1 month); for paratyphoid fever (range 1 - 10 days).
- **Common symptoms:** Persons with typhoid fever usually have a sustained fever as high as 103° to 104° F. They may also feel weak, or have stomach pains, headache, or loss of appetite. In some cases, patients have a rash of flat, rose-colored spots. Relapses are common. Fatalities are less than 1 percent with antibiotic treatment.
- **Treatment:** Three commonly prescribed antibiotics are ampicillin, trimethoprim-sulfamethoxazole, and ciprofloxacin. Persons given antibiotics usually begin to feel better within 2 to 3 days, and deaths rarely occur.

### C. Reservoirs

Humans are the only known reservoir for *S. typhi*; for paratyphoid, reservoirs include humans and rarely domestic animals. The human carrier state may follow acute illness as well as mild or subclinical infections. The chronic carrier state is most common among persons infected during middle age, especially women.

### D. Modes of Transmission

Infection occurs by eating food and/or water contaminated by feces and/or urine of cases and carriers. Important vehicles in some countries include shellfish taken from sewage-contaminated beds (particularly oysters), raw fruits and vegetables, and contaminated milk and milk products. Flies may infect food in which the organism then multiplies to achieve an infective dose.

**E. Period of Communicability**

The disease is communicable for as long as the bacilli appear in stool, usually from the first week of infection throughout convalescence; variable thereafter (usually 1-2 weeks for paratyphoid). About 10% of untreated typhoid fever cases discharge bacilli for 3 months after onset of symptoms, and 2% - 5% become permanent carriers, with fewer paratyphoid than typhoid case-patients becoming permanent gallbladder carriers.

## 2) ACTIONS REQUIRED/CONTROL MEASURES

### A. Reporting Requirements

Typhoid fever is physician reportable by mail within 12 hours of recognition or strong suspicion to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). **Additional requirements:** Isolates of *Salmonella* must be submitted to the DPH State Laboratory for confirmation. See current lists of physician Reportable Diseases (Attachment A) and Laboratory Reportable Significant Findings (Attachment C).

### B. Case Definition

- **Confirmed Case:** Isolation of *S. typhi* or *S. paratyphi* from blood, stool, or other clinical specimen.

### C. Case Investigation

- **DPH Responsibility:** DPH is available to the LHD for assistance, consultation, and guidance and to ensure that appropriate investigative and control actions are being taken.
- **LHD Responsibility:** Complete the CDC “*Typhoid and Paratyphoid Fever Surveillance Report*” (Attachment K). Completed forms should be scanned and uploaded to Maven or faxed to the DPH at 860-509-7910. In addition, interview the case and identify individuals in high-risk occupations or settings (see below). Provide information and educational materials that describe the nature of the disease and preventive measures. Proper hand washing should be stressed for all cases and contacts. Encourage a physician visit if symptoms persist.

### D. Control Measures

- **Food Handler, health care provider, day care attendee or staff member:**  
Exclude from food handling, patient care, or day care center until the following are met:

*Three consecutive negative stool cultures that are:*

- taken not earlier than 1 month after onset, and
- taken at least 24 hours apart, and
- taken at least 48 hours after any antibiotic treatment.

When *S. Typhi* infection is identified in a symptomatic child care attendee or staff member, stool cultures should be collected from other attendees and staff members, and all infected people should be excluded.

**Comment:** *Even with antibiotic treatment, infected persons may continue to shed the infectious organism. Shedding is highest during the month following onset of illness; thus, it is recommended to begin culturing one month following onset of illness.*

- **Household contact that is a food handler, health care provider, or day care attendee or staff member:**  
Exclude from food handling, patient care, and day care center until the following are met:

*Two consecutive negative stool cultures that are:*

- Taken at least 24 hours apart, and
- Taken at least 48 hours after any antibiotic treatment.

- **Typhoid carrier who is a food handler or health care provider**

Exclude typhoid carriers from handling food and from providing patient care until the following are met:

Three consecutive negative stool cultures that are:

- taken at least **1 month apart**, and
- taken at least 48 hours after any antibiotic treatment.

- **Culturing of household contacts**

Ideally, all household contacts should be cultured to identify additional cases or carriers. If this is not possible, then culture household contacts meeting the following criteria:

- persons who traveled with the confirmed case, or
- persons who are in high-risk occupations (food handlers, health care providers, day care attendee or staff member).

## Fact Sheet

### What is typhoid fever?

Typhoid fever is a bacterial illness caused by a unique strain of *Salmonella* called *Salmonella typhi* (*S. typhi*). This bacterium affects the intestinal tract and occasionally the bloodstream. Most cases reported in the United States are acquired during foreign travel to underdeveloped countries.

### Where are *S. typhi* bacteria found?

*S. typhi* can be found in people.

### How do these bacteria spread?

*S. typhi* bacteria are passed in the stool and, to some extent, the urine of infected people. The bacteria are spread by eating or drinking water or foods contaminated by stool from an infected individual.

### Who gets typhoid fever?

Anyone can get typhoid fever but the greatest risk exists to travelers visiting countries where the disease is common. Occasionally, local cases can be traced to exposure to a person who is a chronic carrier.

### What are the symptoms of typhoid fever?

Persons with typhoid fever usually have a sustained fever as high as 103° to 104° F. They may also feel weak, or have stomach pains, headache, or loss of appetite. In some cases, patients have a rash of flat, rose-colored spots. Relapses are common. Fatalities are less than 1 percent with antibiotic treatment.

### How soon do symptoms appear?

Depending on the size of the infecting dose, symptoms generally appear from 8 – 14 days after exposure (range 3 days to 1 month).

### How long can an infected person carry the typhoid bacteria?

The carrier stage varies from a number of days to years. Only about 3% of cases become lifelong carriers of the bacteria, and this tends to occur more often in adults than in children.

### Should an infected person be excluded from work or school?

Except for people in high-risk occupations/settings (food workers, health care providers, day care attendees), most infected people may return to work or school when they have recovered, provided that they carefully wash hands after toilet visits.

### How is typhoid fever treated?

Specific antibiotics are often used to treat cases of typhoid fever.

### What can be done to prevent the spread of typhoid fever?

A vaccine is available; however, it is generally reserved for people traveling to underdeveloped countries where significant exposure may occur. Strict attention to food

and water precautions while traveling to such countries is the most effective prevention method.

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## 1) THE DISEASE AND ITS EPIDEMIOLOGY

### A. Etiologic Agent

Like *Vibrio cholerae*, noncholera *Vibrio* are gram-negative bacilli. These *Vibrio* species (including *V. parahaemolyticus*, *V. vulnificus* and others) are associated with diarrhea, septicemia, and/or wound infections.

### B. Description of Illness

- **General facts:** Noncholera *Vibrio* are bacteria in the same family as those that cause cholera. They live in seawater and are part of a group of *Vibrio* organisms that are called “halophilic” because they require salt.
- **Occurrence:** Most infections occur in warmer months. Sporadic cases and common source outbreaks of *V. parahaemolyticus* (with undercooked seafood as the food vehicle) occur worldwide. Although the annual incidence of *V. vulnificus* is < 0.5 per 100,000 population, it is the most common agent of serious *Vibrio* infections in the United States.
- **Incubation period:** When ingested, noncholera *Vibrio* species cause symptoms within 5 – 92 hours (median 23 hours).
- **Common symptoms:** When ingested, noncholera *Vibrio* species can cause diarrhea often with abdominal cramping, nausea, vomiting, fever, and chills. Severe disease is uncommon and occurs more frequently in persons with weakened immune systems. These *Vibrios* can also cause bloodstream infections of the skin when an open wound is exposed to seawater.

### C. Reservoirs

Noncholera *Vibrio* species can be found free in estuarine or coastal marine waters, and in fish and shellfish (especially oysters) in these environments.

### D. Modes of Transmission

Infection occurs through consumption of raw or undercooked seafood (or food contaminated by raw seafood), by rinsing food with contaminated water. Wound infections commonly result from exposure from abrasions exposed to contaminated seawater or from punctures resulting from handling contaminated shellfish.

### E. Period of Communicability

Noncholera *Vibrio* infections are not considered to be communicable from person to person, but can be transmitted through ingestion of food or water contaminated directly or indirectly with feces or vomitus of infected persons.

## 2) ACTIONS REQUIRED/CONTROL MEASURES

### A. Reporting Requirements

Noncholera *Vibrio* infections are laboratory reportable, and *V. parahaemolyticus* and *V. vulnificus* are also physician reportable by mail to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). **Additional requirements:** All *Vibrio* isolates must be submitted to the DPH State Laboratory for confirmation. See current lists of physician Reportable Diseases (Attachment A) and Laboratory Report of Significant Findings (Attachment C).

### B. Case Definition

- **Confirmed Case:** Isolation of *Vibrio* spp. other than *Vibrio cholerae* O1 or O139 from a clinical specimen.

### C. Case Investigation

- **DPH Responsibility:** DPH is available to the LHD for assistance, consultation, and guidance and to ensure that appropriate investigative and control actions are being taken.
- **LHD Responsibility:** Complete the CDC “*Cholera and Other Vibrio Illness Surveillance Report*” form (Attachment G). Completed forms should be scanned and uploaded to Maven or faxed to the DPH at 860-509-7910.

Provide information and educational materials describing the nature of the disease and preventive measures. Stress the importance of thoroughly cooking seafood and handling uncooked seafood with care.

### D. Control Measures

Recommendations on exclusion from high-risk occupations or settings should be made in conjunction with DPH.

## Fact Sheet

### **What are noncholera *Vibrio*?**

Noncholera *Vibrio* are bacteria in the same family as those that cause cholera.

### **Where are noncholera *Vibrio* bacteria found?**

Noncholera *Vibrio* bacteria live in saltwater and are commonly found in marine environments and estuaries. These bacteria are frequently isolated from oysters and other shellfish during the summer months.

### **How does this bacteria spread?**

Noncholera *Vibrio* can cause disease in people who eat contaminated seafood or have an open wound that is exposed to seawater. There is no evidence for person-to-person transmission of noncholera *Vibrio*.

### **Who gets infected with noncholera *Vibrio*?**

Persons who are immunocompromised, especially those with chronic liver disease, are at risk for noncholera *Vibrio* infection when they eat raw seafood, particularly oysters. Since noncholera *Vibrio* are naturally found in warm marine waters, people with open wounds can be exposed to noncholera *Vibrio* through direct contact with seawater.

### **What are the symptoms of noncholera *Vibrio* infection?**

Among healthy people, ingestion of noncholera *Vibrio* can cause vomiting, diarrhea, and abdominal pain. In immunocompromised persons, particularly those with chronic liver disease, noncholera *Vibrio* can infect the bloodstream, causing a severe and life-threatening illness.

Noncholera *Vibrio* can also cause an infection of the skin when open wounds are exposed to warm seawater. These infections may lead to skin breakdown and ulceration.

### **How soon do symptoms appear?**

Symptoms usually occur within 24 hours of eating contaminated food or within 12 to 72 hours after exposure to contaminated seawater.

### **What is the treatment for noncholera *Vibrio* infection?**

Patients with diarrhea should drink plenty of liquids to replace lost fluids. In severe illnesses, (e.g., bloodstream or wound infection) antibiotics may be used.

**How can this infection be prevented?**

Some tips for preventing noncholera *Vibrio* infections, particularly among immunocompromised patients, including those with underlying liver disease:

1. Do not eat raw oysters or other raw shellfish.
2. Cook shellfish (oysters, clams, mussels) thoroughly:
  - For shellfish in the shell, either a) boil until the shells open and continue boiling for 5 more minutes, or b) steam until the shells open and then continue cooking for 9 more minutes. Do not eat those shellfish that do not open during cooking.
  - Boil shucked oysters at least 3 minutes or fry them in oil at least 10 minutes at 375°F.
3. Avoid cross-contamination of cooked seafood and other foods with raw seafood and juices from raw seafood.
4. Eat shellfish promptly after cooking and refrigerate leftovers.
5. Avoid exposure of open wounds or broken skin to warm salt or brackish water and raw shellfish harvested from such waters.
6. Wear protective clothing (e.g., gloves) when handling raw shellfish.

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## 1) THE DISEASE AND ITS EPIDEMIOLOGY

### A. Etiologic Agent

Yersiniosis is an enteric bacterial illness caused by *Yersinia enterocolitica* or *Yersinia pseudotuberculosis*, which are gram-negative bacilli. These bacteria cause a number of age-specific syndromes and a variety of uncommon presentations.

### B. Description of Illness

- **General facts:** Most reported cases of yersiniosis are caused by *Y. enterocolitica*, which responds to treatment with antibiotics. Unlike many foodborne pathogens, *Yersinia* multiplies in cooler temperatures with little air (e.g., refrigeration).
- **Occurrence:** Worldwide, with the highest rates reported during the cold season in temperate climates such as North America and northern Europe. About 2/3 of *Y. enterocolitica* cases occur in infants and children, and 3/4 of *Y. pseudotuberculosis* cases occur in persons 5 - 20 years old.
- **Incubation period:** Usually 4-7 days after exposure.
- **Common symptoms:** Intestinal inflammation with fever and diarrhea, often with blood or mucus in stool, is most common for *Y. enterocolitica* infection in young children. Less commonly, post-infectious arthritis and systemic infection may occur. Infections in older children and adults can mimic acute appendicitis with fever, abdominal pain, and tenderness of the abdomen; outbreaks may be recognized by local increases in appendectomies. Fever, rash, and abdominal pain are common symptoms of *Y. pseudotuberculosis* infection; diarrhea and less commonly septicemia may occur. Prolonged asymptomatic carriage is possible.
- **Treatment:** Organisms are sensitive to many antibiotics, but are generally resistant to penicillin and its semi-synthetic derivatives. Treatment may be helpful for gastrointestinal symptoms; definitely indicated for septicemia and other invasive disease. Agents of choice against *Y. enterocolitica* are the aminoglycosides (septicemia only) and trimethoprim-sulfamethoxazole. Newer quinolones such as ciprofloxacin are highly effective. Both *Y. enterocolitica* and *Y. pseudotuberculosis* are usually sensitive to tetracyclines.

### C. Reservoirs

Animals, with swine as the principal reservoir for *Y. enterocolitica*; asymptomatic carriage of the bacteria is common in pigs, especially in winter. *Y. pseudotuberculosis* is primarily a zoonotic disease of wild and domesticated birds and mammals (particularly rodents and other small mammals), with humans as an incidental host.

### D. Modes of Transmission

Transmission is through the fecal-oral route, with infections occurring with the consumption of food and/or water contaminated by contact with infected people or animals. *Y. enterocolitica* is most commonly associated with raw or undercooked pork and pork products (especially pork intestines, or chitterlings, in the United States). Human cases have been reported in association with disease in household pets, particularly sick puppies and kittens.

**E. Period of Communicability**

Secondary transmission is thought to be rare; however, an infected person excretes the organism in stool for at least as long as symptoms exist (approximately 2-3 weeks). Untreated cases may shed for as long as 2-3 months. Both children and adults have been reported with prolonged asymptomatic carriage.

## 2) ACTIONS REQUIRED/CONTROL MEASURES

### A. Reporting Requirements

Yersiniosis is laboratory reportable by mail to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). See current list of Laboratory Reportable Significant Findings (Attachment C).

### B. Case Definition

- **Confirmed Case:** Isolation of *Yersinia* from any clinical specimen.

### C. Case Investigation

- **DPH Responsibility:** DPH is available to the LHD for assistance, consultation, and guidance and to ensure that appropriate investigative and control actions are being taken.
- **LHD Responsibility:** Using the “General Enteric Diseases Interview Form” (Attachment F), interview case and identify individuals in high-risk occupations or settings (see below). Completed GEDIF forms should be entered directly into Maven or faxed to the DPH at 860-509-7910.

Provide information and educational materials describing the nature of the disease and preventive measures. The importance of frequent and thorough hand washing should be stressed for all cases and contacts. Encourage a physician visit if symptoms persist.

### D. Control Measures for Individuals in High-Risk Occupations or Settings

- **Food Handler:** Individuals with laboratory-confirmed infection should be excluded from direct food handling until they are asymptomatic. Exclusion of asymptomatic individuals is indicated only for those with questionable hygienic habits. Proper hand washing should be stressed.
- **Health Care Worker with Direct Patient Contact:** Individuals with laboratory-confirmed infection should be excluded from direct care of patients until they are asymptomatic. Exclusion of asymptomatic individuals is indicated only for those with questionable hygienic habits. Proper hand washing should be stressed.
- **Day Care Setting:** Symptomatic children in diapers should be excluded from day care. Improved sanitation and personal hygiene should be emphasized in day care settings. Proper hand washing by staff and children should be stressed, especially after using the toilet and/or handling soiled diapers, and prior to preparing or eating food.
- **Household Contacts:** Household contacts with diarrhea should be excluded from food handling and the care of children and/or patients until they are asymptomatic. Proper hand washing should be stressed.

## Fact Sheet

### What is yersiniosis?

Yersiniosis is an illness that is caused by the bacterium called *Yersinia enterocolitica*. It generally affects the intestinal tract. It is a relatively uncommon illness and usually occurs as a single isolated case. Occasional outbreaks have been reported due to a common exposure.

### Where are *Yersinia* bacteria found?

Animals, especially pigs, are the main source of *Yersinia*. Fecal wastes from animals may contaminate water, milk, and foods and become a source of infection for people or other animals.

### How do these bacteria spread?

*Yersinia* bacteria are spread by eating contaminated food, especially raw or undercooked pork products. The preparation of raw pork intestines (chitterlings) may be particularly risky. Infants can be infected if their caretakers handle raw chitterlings and then do not adequately clean their hands before handling the infant or the infant's toys, bottles, or pacifiers. Drinking contaminated unpasteurized milk or untreated water can also transmit the infection. On rare occasions, it can be transmitted as a result of the bacterium passing from the stools or soiled fingers of one person to the mouth of another person.

### Who gets yersiniosis?

Any person can get yersiniosis, but it occurs more often in children.

### What are the symptoms?

Infected people may experience mild or severe diarrhea, fever, and abdominal cramps. Sometimes, *Yersinia* infection may mimic appendicitis.

### How soon do symptoms appear?

Symptoms generally appear 4 to 7 days after exposure.

### How long can an infected person carry the germ?

The bacteria are passed in the feces during the time the person is experiencing diarrhea and in some cases for a few weeks or months afterward.

### How is yersiniosis treated?

Most cases recover without treatment. Those with severe symptoms or bloodstream infections are generally treated with antibiotics.

**How can yersiniosis be prevented?**

- Avoid eating raw or undercooked pork.
- Drink only pasteurized milk or milk products.
- Wash hands with soap and water before eating and preparing food, after handling raw meat, and after contact with animals.
- After handling raw chitterlings, clean hands and fingernails with soap and water before touching infants or their toys, bottles, or pacifiers.
- Carefully clean all cutting boards, counter tops, and utensils with soap and hot water after preparing raw meat.

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*This fact sheet is for information only and is not meant to be used for self-diagnosis or as a substitute for consultation with a health care provider. If you have any questions about the disease described above or think that you may have this infection, consult a health care provider.*

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